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The Controversial Behavior Of Romanian Consumers Regarding The Safety Of Flu Shot Immunization

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Summary

Nowadays effectiveness, safety and security of vaccines are widely used terms, giving birth to controversies regarding the efficiency and risks of the recommended immunization.

The paper analyses the Romanian population's behaviour regarding immunization against flu, from the consumer protection point of view. In the international literature there are studies regarding the efficacy and effectiveness of influenza vaccines from a medical point of view, not from the consumer protection or consumer behaviour perspective. We are interested in identifying the profile of the Romanian consumers in terms of accepting or not flu immunization, the perception of the consumer concerning flu shot safety and the main factors which determine the consumer's behaviour. In this context, we started our study using as background the following: the history of influenza and vaccination, a market research in Romania and abroad, and some controversies regarding the efficiency and safety of flu shot (the pros and cons immunization).

In order to obtain pertinent data, we proceed with a factor analysis that reduces significantly the decision model analysis (using the Likert scale, the KMO test and the Kaiser criteria). Therefore, a survey has been conducted among 303 respondents from Romania, who belong to different social classes.

We concluded how important mass media, medical profession bodies' involvement and self-documentation are in drawing up a clear opinion regarding consumers' immunization, which is anyway extremely subjective.

The key findings of this study outline the fact that mass media plays an essential role in directing the debate in favour or against flu shot administration towards a general agreement.

Keywords: consumer protection, immunization, flu shot, controversies, safety.

JEL Classification: M31, D18, I12, C10

1. Introduction

Consumer protection is in general a group of laws and organizations designed to ensure the rights of consumers, as well as fair trade, competition and accurate information in the marketplace. Consumer protection is also a socio-economic field which studies the consumer rights, behaviour, security, satisfaction and the risks that may occur in market practices, which might harm the health, integrity, and even the life of consumers. Consumer protection laws are designed to prevent businesses that

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engage in fraud or specific unfair practices from gaining an advantage over competitors, and to guarantee additional protection for the most vulnerable groups of the society. Consumer protection - as an important aspect of social protection - aims to promote relentlessly the interests of consumers, building awareness regarding their rights and the dangers posed by certain categories of consumption goods/services. Concerning the second aspect, it should be noted that the market is not in equilibrium. This always affects consumers under several aspects: economic, social, health and safety.

Consumer protection tries to help the population to participate actively in the market processes, not only when buying goods, but also when requesting services. One of the services offered by the "health care industry" is immunization. Vaccination must be the most effective strategy to protect children and adults against certain diseases. When a large percentage of people are immunized against a specific disease, it becomes harder for that disease to spread.

There are many types of vaccines, protecting consumers against infectious or non-infectious diseases. The infectious diseases such as measles, mumps, rubella, polio, diphtheria, flu and whooping cough were common in the pre-immunization era, causing significant disability and death. In order to accomplish the aims of our research, we will focus only on flu immunization.

Our research aims to focus on the Romanian consumer behaviour regarding immunization against flu, from the consumer protection point of view. In particular, we are interested in finding out the profile of Romanian consumers who accept or do not accept flu immunization, the perception of the consumer concerning the security of flu shots and the main factors which determine the consumer's behaviour regarding that issue.

We have to state from the beginning of our research that we have not found such a behavioural study from the consumer protection point of view in the international literature. At the same time it must be stated that nowadays, publications in the consumer protection field are focused only on the legislative aspect of that domain; the only book which analyses consumer protection as a scientific field and practical activity, which outweighs the mentioned legislative point of view is "Consumer protection in the contemporary consumer society", Csorba (2015). Also, there are just a few articles with focus on the drugs consumer protection field, but not on vaccination or immunization against flu.

In the international literature there are studies regarding the efficacy and effectiveness of influenza vaccines from a medical point of view, but not from the consumer protection or consumer behaviour point of views, in order to find out the main factors influencing the flu shot consumer's behaviour. In this context, we started our study basing it on: the historical background of influenza and vaccination, a market research in Romania and abroad, and some controversies regarding the efficiency and security of flu shot, namely, the consumers' opinions in favour of or against immunization all over the world.

Historical background of influenza and vaccination

Influenza is a mysterious disease, even today not totally understood. It would be inappropriate to see it as a single disease, because it is a collection of several diseases; it is caused by a mixture of viruses that can quickly become mutants. Often we can even talk about a hybrid between a pre-existing form of human influenza virus and related viruses with animal origin. This variability has made all the efforts to produce a flu shot

so far fail. Therefore, when new forms of influenza appear, the danger is global.

It was believed that Pfeiffer's bacillus (named after the man who discovered it, R. F. J. Pfeiffer) was the only cause for influenza outbreaks. However, at the onset of influenza its importance was found insignificant. Irony of fate was when A. Fleming prepared the first crude penicillin crop (1928), thus becoming the first person who used this substance as laboratory antiseptic, in order to obtain Pfeiffer bacillus uncontaminated cultures, later calling this bacillus: Bacillus influenzae, Cartwright and Biddiss (2006).

Flu or influenza is considered to be a relatively modern disease; reliable information on the disease began to be publicised only in the eighteenth century. Martin and Martin-Granel (2006) found out that the first description of influenza comes from the ancient Greek philosopher and physician Hippocrates, some 2400 years ago.

Webster and Walker (2003) stated that the first influenza pandemic, which began in Russia and spread to Europe via Africa, was recorded in 1580. As a result of this pandemic over 8,000 people died only in Rome and several Spanish cities were almost wiped out.

The orthomyxoviridae which caused influenza was discovered by the Medical Research Council of the United Kingdom in 1933. Influenza is an infectious respiratory disease caused by type A, B and C influenza viruses (researchers in the 1940s classified "the flu" into these three types, based on their protein compositions. Furthermore, they subdivided the types based on external structure, which determines how a particular virus attacks and colonizes the human respiratory system).

Beveridge (1991) underlines that although the virus seems to have caused epidemics throughout the human history, historical data on influenza are difficult to interpret, because the symptoms can be similar to those of other respiratory diseases. Potter (2001) claims that the disease may have spread from Europe to the Americas during the European colonization. In the opinion of Guerra (1993), almost the entire indigenous population of the Antilles was killed by an epidemic resembling influenza that broke out in 1493, after the arrival of Christopher Columbus.

The best known flu pandemics during history were:

- The Asiatic or Russian flu pandemic (1889-1890), which caused the death of 1 million people, *Valleron et al. (2010);*
- The 1918 Spanish flu pandemic, the most severe influenza pandemic to date, which swept the globe for two years, infecting about 30% of the human population and killing an estimated 50 to 100 million people. The great 1918 pandemic was unusual because it claimed the lives of too many healthy young adults, *Mills et al. (2004). Potter says that* this pandemic has been described as "the greatest medical holocaust in history" and may have killed as many people as the Black Death did, Potter (2001);
- The Asian Flu (1957-1958), killing around 1 million - 1,5 million people;
- The Hong Kong Flu (1968-1969), killing 750,000 to 1 million people;
- The Russian Flu (1977-1978). Statistical data are not clear, so, we don't have an accurate number of the victims;
- The 2009 Flu Pandemic (2009-2010), reported 18,000 confirmed cases, claimed Donaldson et al. (2009). At the same time, Dawood et al. (2014) study shows that the 2009 Flu Pandemic killed between 105,700 and 395,600 people.

When influenza hits, the most common victims are young children, the elderly and people with compromised immune systems.

The first significant step towards preventing influenza was the development in 1944 of a killed-virus vaccine for influenza by Thomas Francis, Jr. He allowed his group of researchers at the University of Michigan to develop the first influenza vaccine, with support from the U. S. Army. The Army was actively involved in this research due to its experience in influenza in World War I, when thousands of troops were killed by the virus in a matter of months, Knobler et al. (2005).

Due to these results, when the influenza pandemics of 1957 and 1968 hit, scientists were able to identify the diseases' predominant viral strains and design preventive vaccines tailored to those strains. The medical historian Dehner (2012) said that the variants of those strains changed constantly, far too quickly for the vaccines to keep pace. That's only one of the reasons why this is still an inexact science, unable to keep up with the speed at which viruses can spread and morph, a phenomenon dramatically amplified by global travel in recent years.

Nowadays, in the USA and in Europe, two types of influenza vaccines are available: inactivated injectable influenza vaccine and live attenuated influenza vaccine. Inactivated, injectable influenza vaccines packaged in multi-dose vials contain the mercury preservative thimerosal, but inactivated influenza vaccines in single dose vials are thimerosal-free or contain negligible amounts of the mercury preservative. The live attenuated nasal influenza vaccine does not contain thimerosal.

The World Health Organization estimates that flu kills up to 500,000 people every year. That's why nowadays specialists recommend the consumers from six months of age or older to get a flu shot every year throughout life.

How many people have died from getting flu shots and how many deaths have been avoided because people didn't get the flu after getting a shot? How safe, efficient and necessary is vaccination against flu? Does immunization have side effects? How dangerous are the side effects of vaccination? Doesn't mandatory vaccination violate the individual rights and principles? These are some question always raised by consumers, which need objective answers.

The Flu Shot market in Romania and abroad

According to the World Health Organization, each year between 250,000 to 500,000 deaths and 3-5 million serious illnesses caused by epidemics of influenza are registered in the developed countries only. Most deaths caused by this contagious disease are at the 65-year or older population. Annually, the incidence of flu epidemic affects between 5-10% of the adults and around 20-30% of children all over the world.

Globally, we can observe a decrease in the interest in vaccination, a valid trend for all areas of vaccines. Maybe this trend is influenced by the controversial news regarding the negative effects of immunization. For example, a report released in December 2013 by the USA Department of Justice (Vaccine Court), concerning the compensations made by the Health and Human Services for people harmed or killed by vaccines, covered the period from August 16 2013 to November 15 2013. There were 139 claims settled during this time period, with 70 of them being compensated. The greatest percentage of compensated damage was for the influenza vaccine, and most of those for Guillain-Barré Syndrome. Out of 70 compensated cases, 42 were for the flu vaccine (60% of the settled cases were compensations for injury or death due to the vaccine). The combined total of the other 40% of settled cases included the following vaccines: Hepatitis B, Tetanus, HPV, DTaP, MMR, IPV, PCV, Hib, TD, Varicella and Meningococcal.

The report shows clearly that the flu vaccine is a dangerous vaccine in America today, but that fact is not mentioned by the mainstream media. These cases are the ones that were compensated for injuries and deaths due to vaccines, which are only about 50% of the claims filed. The other 50% of vaccine injuries or deaths filed received nothing (medalerts.org, 2016).

As can be seen in this report and other reports about government payments for vaccine injuries, Guillain-Barré Syndrome is the most common side effect and injury due to the flu vaccination. GBS can cause symptoms that last for a few weeks. Most people recover fully from GBS, but some people have permanent nerve damage. In very rare cases, people have died of GBS, usually from difficulty in breathing.

On 1st September 2015, there were 2,071 claims filed in the federal Vaccine Injury Compensation Program (VICP) for injuries and deaths following Influenza vaccination, including 92 deaths and 1,979 serious injuries. Using the MedAlerts search engine, as of September 30, 2015, there have been more than 104,465 reports of reactions, hospitalizations, injuries and deaths following influenza vaccinations made to the federal Vaccine Adverse Events Reporting System (VAERS), including 1,115 related deaths, 9,037 hospitalizations and 2,003 related disabilities. In 2013, the Federal Advisory Commission on Childhood Vaccines (ACCV) voted to add GBS to the Vaccine Injury Table within the federal Vaccine Injury Compensation Program (VICP) (nvic.org, 2016).

In Europe, annual epidemics of influenza are associated with a high morbidity and mortality. In accordance with the European Centre for Disease Prevention and Control, around 40,000 people from the EU countries die prematurely each year because of flu (ecdc.europa, 2017).

The statistics of a study conducted in 15 EU countries show that in the 2007-2008 influenza season, the only countries that exceeded the target of 75% vaccination rate for older people, as recommended by the WHO and the EU Council, were the Netherlands, with a coverage of 82%, and the UK, which recorded a 78% vaccination rate. In the Netherlands, in 2014, less than 75% of the population was immunized against influenza (ecdc.europa, 2014).

Since 2009 the UK Organization of Employers of Public Health System (NHS) with the support of the British Ministry of Health and Public Health Institute has organized the annual "Flu Fighter" campaign to inform healthcare professionals about the seasonal flu. The results of this information and education effort were visible. The rate of vaccination among health sector employees who worked directly with patients rose from 35% in the 2010-2011 influenza season, to 45% in the 2011-2012 season, then to 46% in the 2012-2013 season, reaching a vaccination rate of 55% in winter season 2013-2014 (nhsemployers.org, 2017).

As part of the same program, the Ministry of Health submit annually a letter informing doctors concerning the UK's national immunization program against seasonal influenza ("The Annual Flu Letter").

In the Netherlands there are about 65 Sentinel type centres. With the introduction of a national program of vaccination for elderly, this exceeded the coverage target of 75%; that way, in the Netherlands the mortality rate caused by flu among this population segment decreased by 35%.

The impressive growth rate of influenza vaccination in the Netherlands was determined by a number of factors, established by Darvishian et al. (2017):

- A well developed electronic national system of the medical records which allows medical staff to identify the patients from

the risky groups who respond to their invitation for vaccination (approximately 30% of the population);
- Free vaccination of patients at risk;
- A guaranteed remuneration for the doctors who vaccinate;
- Centralization of the incomes from flu vaccines at government level;
- Simple documents filled out by family doctors;
- Systematic feedback in evaluating the campaign efforts and results.

In European context, Romania is located at the bottom of the ranking on the issue of the population's immunization rate. In recent years, flu shot has become less popular. The recommended immunization rate by the World Health Organization is 20%. The flu vaccination rate of the Romanians in the last 5 years was of around 3% on the average, while in the last four years, more than 100 Romanians died because of the complications caused by influenza (ec. europa.eu/eurostat, 2017).

In Romania the vaccine against flu reaches the consumers in two ways:
- for free, through the Ministry of Health. This vaccine is designated for persons from the risky groups (children younger than 5, pregnant women, adults 65 years of age and older, residents of nursing houses, people with certain chronic disease);
- through pharmacies, for the other part of the population. So, it is difficult to assess how many doses are sold each year in pharmacies in Romania.

The percentage of Romanians who choose to protect themselves against flu by getting vaccinated has declined. Statistics show that the greatest number of vaccine doses were purchased by the Ministry of Health in the 2007-2008 winter season, more specifically 3.7 million. The number of doses decreased over time, because of the decline in the intensity of their use. Thereby, in 2010-2011 season were purchased 1.3 million doses, and in 2011-2012, 2012-2013, 2013-2014 seasons, barely one million doses. In the 2014-2015 season were purchased only 500,000 doses, in the 2015-2016 season the purchases reached 650,000 doses. More specifically, only in year 2015 were purchased 635,000 doses, 98% of them being used. The Romanian Ministry of Health purchased around 600,000 doses for the 2016-2017 winter season. That way, in the last 7 years, the number of doses ordered by the Ministry for the immunization program, decreased systematically (see table 1).

Table 1. *Doses of vaccines purchased by the Ministry of Health in Romania*

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Flu shot doses	3.7 million	1.5 million	1.3 million	1.1 million	1 million	1 million	0.5 million	0.65 million	0.6 million

Source: author's adaptation after digi24.ro, 2016

In May 2009, globally, WHO declared the first pandemic after 40 years, with the multiplication and spread of swine flu (H1N1 influenza virus). In Romania, the first cases of swine flu were recorded in May and June 2009, but the top of the pandemic was felt in January 2010, triggering a state of panic and uncertainty. This was a key moment, the attitude of people experienced a radical change against influenza disease and influenza vaccination, due to a communication process handled

inconsistently by the competent authorities and medical institutions, and manipulated by the media, which, in the end, have generated long term unfavourable background of immunization through vaccination. WHO announced the end of the pandemic in May 2010, after flu had affected people in 214 countries and 18,138 deaths were recorded worldwide (cdc.gov, 2017).

During the 2009 pandemic, in Romania there were 7008 cases of illness and 122 deaths.

Incoherence and late performance of annual influenza vaccination campaigns, temporary lack of mandatory vaccines in hospitals and the side effects which occurred in children who used imported vaccines, affected adversely immunization in Romania.

Contrary to the WHO recommendations regarding influenza vaccination, starting in 2011, in Romania there was a tendency for rejection of immunization, with only vaccines recommended by the Ministry of Health and the National Programmes being accepted. 755 cases of influenza were confirmed in the 2012-2013 season, which is 2.5 times more compared to the previous season, of which 21 cases resulted in death. In that season, of the total of 1,000,000 doses of flu vaccine distributed by the Ministry of Health to vaccinate the population groups considered at risk, 904,251 people were vaccinated; vaccination coverage of Romanian population was only 4.2%. 42% of medical staff was vaccinated and the population aged over 65 - only 14.9%.

The 2013-2014 season turned into a national failure, presenting the most comprehensive picture of the authorities disinterest and chaotic communication in the absence of a National Strategy for vaccination. Vaccination coverage of the Romanian population was only 2.7%, while 1294 cases of influenza were confirmed (cnscbt.ro, 2017).

During the 2014-2015 season, a total of 500,000 doses of flu vaccines were distributed by the Ministry of Health to vaccinate the population groups considered at risk - 492,176 people were vaccinated; vaccination coverage of the Romanian population was only 2.5%, while the confirmed cases of influenza were 4511 (cnscbt.ro, 2017).

During the 2015-2016 season, a total of 642,810 doses of flu vaccines were distributed by the Ministry of Health to vaccinate the population groups considered at risk, 636,755 people were vaccinated; vaccination coverage of the Romanian population was only 3.2% (cnscbt.ro, 2017).

In 2014, the access of the Romanian population to the flu shot vaccine was limited by an early incident when the Ministry of Health withdrew 350,000 doses from the Cantacuzino Institute, because they had a lower degree of efficiency than they should have. Although the Ministry of Health has imported 600,000 doses of flu vaccine from the Netherlands, the Cantacuzino Institute made available another 400,000 doses from its own production that later were considered dangerous and withdrawn from the market. That way, the last Cantacuzino production was delivered on the Romanian market in 2013. So, the Cantacuzino production delay caused a domino effect, respectively delays in the start of the vaccination campaign, and its closure by the Ministry of Health became official in early February 2014, when influenza vaccination was still required.

Dr. David Fedson, professor at Faculty of Medicine, University of Virginia, explained that low influenza vaccination in our country is not related to the economic situation. There are rich countries where the vaccination rate is lower and poor countries where vaccination is popular. Countries with the same economic development as Romania have surprisingly high vaccination

rates: Mexico, Uruguay, Chile and so on (cnscbt.ro, 2017).

According to a study presented by the professor, the main reason why immunization is not popular around the world is that people do not believe that it works and they fear its side effects. To this could be added the fear of needles, the belief that the vaccine could cause influenza rather than prevent it, and the conviction of some consumers that they are not among the categories of people at risk of disease. Thereby, not the quantity of vaccines is the problem, but the fact that there is not enough interest in their administration.

5-15% from the population in Romania suffers from flu yearly. The Romanians who have trust in anti-flu vaccination are the elder and the people with chronic disease, who are also those categories that are always included in the yearly free immunization program of the Health Ministry. The young and active people are those categories who don't have real interest in being vaccinated.

The European Commission analyzed the causes which determine the low rate of influenza vaccination in the European Union member states, including Romania. The identified causes were grouped into two categories: barriers of perception that rule out vaccination among risk categories and barriers of perception among staff in the healthcare sector (cdc.gov, 2017).

Most of the perception barriers among the population refer to:

- perceived low risk of the disease;
- fear of possible side effects of vaccination;
- lack of confidence in the effectiveness of vaccination;
- general anti-vaccination attitudes;
- issues like cost, availability and comfort;
- misinformation generated by the media;
- lack of accurate information about influenza and vaccination;
- other factors: sluggish recovery vaccination costs, limited financial incentives for family doctors for influenza vaccination, limited tax incentives for companies to vaccinate employees and scepticism or low level of awareness among health professionals.

The barriers of perception among staff in the healthcare sector are:

- perceived low risk of the disease;
- concerns about the safety of the vaccine;
- general misinformation;
- low level of awareness of health professionals about the dangers posed to patients who avoid vaccination and a low level of interest in giving appropriate advice on vaccination.

At the end we have to conclude that there are many factors that determine the flu shot consumer behaviour worldwide: cultural background, the current political system, the current health system, the influence of the social environment on the consumers' behaviour, and so on. In our case study we intend to find out the main factors which may influence the Romanian potential consumer to accept or not immunization against flu.

Is vaccination against flu risky? Consumers Pros and Cons regarding immunization

Vaccine controversies had raged for almost 80 years before the terms vaccine and vaccination were introduced, and they continue nowadays. The flu shot vaccine is a controversial topic because immunization has its advantages and disadvantages. These arguments have reduced vaccination rates in certain communities, resulting in outbreaks and deaths from preventable childhood diseases, Poland and Jacobson (2011). Physician R. Wolverton says that death as a result of getting a flu shot is very rare (risk of death from any vaccine is rare, and allergic reactions to egg components

might be the only fatal reaction, because the injectable vaccine contains no live virus and cannot cause influenza). It is difficult to estimate the number of deaths avoided through vaccination, but given the number of actual deaths recorded from influenza all over the world, the number of potential life saved is huge.

Another thing to consider is the economic cost of flu, if not prevented. Influenza can cause serious public health problems, the effects being felt in economic terms by lowering labour productivity and absenteeism, these being probably the most important economic consequences. This indirect cost is determined by sick leaves for the periods in which employees are treated against flu or are caring for children with flu. Also, the high costs of complications arising as a result of contracting influenza are burdening the healthcare system.

Uhart et al. (2016) underlined that the estimated total direct and indirect costs of an influenza epidemic in high income countries were estimated at €56.7 million per one million people.

There are certainly plenty of experts who still endorse the influenza vaccine. One is immunologist M. Ruebush: "Getting the flu vaccine is like taking your immune system to the gym……..your immune system is activated when it responds to the vaccine, keeping it primed for response when the actual virus hits", Ruebush (2009).

Despite these opinions, the controversy over vaccination has intensified in the last years. The efficiency of immunization programs depend on public confidence. Safety concerns often follow a pattern: a potential adverse effect is hypothesized, a premature announcement is made, the initial study is not reproduced, and finally it takes several years to regain public confidence in the vaccine. A recent and notable example is an increased risk of narcolepsy which was found following vaccination with a monovalent 2009 H1N1 influenza vaccine that was used in several European countries during the H1N1 influenza pandemic, sustains Miller et al. (2013). Narcolepsy is a chronic neurological disorder caused by the brain's inability to regulate sleep-wake cycles normally. This risk was initially identified in Finland, and then some other European countries also detected a relation between the two. Recently, scientists at the UK's Health Protection Agency (HPA) have found evidence of a relation between the flu vaccine and narcolepsy in children in England.

In response to the European events, the Centres for Disease Control and Prevention reviewed data from the U.S. Vaccine Adverse Event Reporting System (VAERS) and the Vaccine Safety Datalink (VSD) and found no connection between the seasonal influenza vaccine and narcolepsy. Furthermore, in 2014, CDC published a study on the connection between 2009 H1N1 influenza vaccines, the 2010-2011 seasonal influenza vaccines and narcolepsy. The analysis included more than 650,000 people who were given the pandemic flu vaccine in 2009 and over 870,000 people who received the seasonal flu vaccine in the 2010 - 2011 periods. The study found that vaccination was not associated with an increased risk for narcolepsy. Therefore, CDC recommends influenza vaccination as the best way to protect from influenza and its complications.

Despite those recommendations, consumers who have never received a flu shot before are reserved. At the same time, they have a lot of different considerations to make. Numerous for and against arguments can be pointed out by each potential patient. These are consumers who believe in the efficiency and security of flu shots, making an appointment to get one every time the weather changes, while others do not believe in their effectiveness. Whether we

are in the middle of a flu season or not, it is important to investigate the Pros and Cons, and to make an informed decision.

Mikells (2015) sustains that people who are in favour of Flu Shots, argue their acceptance and appreciation as follows:

1. The shot protects the consumers from more than one form of virus, because it was created for each variety of potential human virus;
2. Getting the flu shot, reduces the risk of coming down with the flu by 70%, according to the Centres for Disease Control and Prevention;
3. Receiving a flu shot does not infect the consumer with the influenza virus. It contains dead viruses, so there is no way of catching the actual sickness;
4. Older people, pregnant women, nursing women, young children, should definitely consider being vaccinated. A six-month-old or younger child must get the vaccination;
5. The H1N1 virus, also known as swine flu, seems to affect young adults and children too;
6. To take a shot doesn't mean for the consumers to be given an injection. Patients can find the flu shot on the market in the form of nasal spray, which is approved for use on people between 2 and 49 years;
7. There are countries which offer the shot for free. If somebody decides to receive a flu shot, there is a good chance to find a place that offers them free of charge.

In our opinion, the immunization of the working population comes with many economic benefits. Vaccination against influenza reduces the costs associated with the loss of productivity. Due to the speed at which influenza spreads, the annual epidemics cause high absenteeism at the workplace, and the costs associated with a low productivity is a significant component of the financial impact of this illness on the society. Some companies choose to invest every year in influenza vaccines, in order to protect their own employees and to reduce the costs associated with absenteeism.

The vaccination of medical staff against influenza protects them and also provides indirect protection of the entire population, especially those with high complication risks, by reducing their exposure to the influenza virus.

In accordance with the European Centres for Disease Control and Prevention, around 180 million people from the EU countries are currently at risk of having complications caused by flu. Generally, the highest risk group consists of people older than 65 years, representing 48% of the total EU population (ecdc.europa, 2017).

If we consider this seriously, every vaccination and/or medication has its side effects. While a flu shot can keep the people safe from the hazards of the winter season, it can also cause complications. So, through the next list of arguments against Flu Shots, we intend to underline the consumers' fears of getting a shot, in the opinion of Mikells (2015):

1. Flu Shots can aggravate allergies. If a person is allergic to eggs or any part of the egg, a flu shot may not be the best idea to protect his health;
2. A Flu Shot is not a guarantee for the consumers to get a robust immune system. There's about a 20% chance that a consumer could still come down with the flu after getting the vaccination. This is because nobody knows exactly how many different flu strands exist;
3. Protection against flu is not immediate. Usually, a flu shot needs roughly two weeks before it begins to work for the safety of the human body;

4. The majority of seasonal flu shots contain a small level of mercury. While mercury in the form of thimerosal has been removed from most children vaccines, it remains in the flu vaccine, which is recommended for young children, pregnant women, the elderly, and, ultimately, for the entire population. Mercury is a well-known neurotoxin, but it is such an effective preservative, that it is used in bulk, multi-dose containers of vaccines.

Some specialists sustain that mercury is added for preservative purposes and has a little chance to affect the recipient in an adverse manner, if the shot has been administered by a trained professional. But for those who do not wish to expose themselves to mercury for any reason, this is valuable information to be aware of (healthimpactnews, 2016).

5. Possible side effects. One of the most dangerous side effects seems to be GBS. But specialists says that there is a negligibly small chance that the flu vaccination could increase the consumers chances of Guillain-Barre Syndrome, a rare disease causing muscle weakness, sometimes paralysis and even death.
6. There are people who consider that vaccination against flu is only a business which brings huge profits to all the parties involved in the process, with the exeption of the consumers, who have to pay for it. These consumers do not believe in a true consumer protection against the risks posed by immunization against flu.

When deciding whether to get a flu shot, a person has to consider a wide variety of factors, ranging from matters of personal preference, to issues that could potentially endanger their safety. We all know ourselves and what we can and cannot handle. It is still considered wise to consult a medical professional if we have any thoughts or concerns prior to receiving a flu shot.

Each potential consumer of a flu shot must be informed about the chosen product/ service. Weintraub (2012) pointed out the usual substances which are inclued in the vaccine composition. First, the consumer has to know that the flu vaccine is prepared in hen eggs, so, consumers allergic to eggs could have a negative reaction. Secondly, the majority of flu vaccines come in multi-dose vials preserved with thimerosal, a form of heavy metal mercury that has been widely implemented in neurological and inflammatory disease. Thirdly, formaldehyde is classified as a human carcinogen substance, by the Department of Health and Human Services. One version of the flu shot used all over the world uses formaldehyde to inactivate the influenza virus in the vaccine-manufacturing process, after which the formaldehyde is purified, but minor amounts may remain. Finally, Polysorbate 80 is linked to infertility and Octoxinol-10 is commonly used as a vaginal spermicide.

How efficient are the shots? It is so hard to answer this question. M. Osterholm, N. Kelley, A. Sommer, E. Belongia are the only authors who have given us an idea about this issue. They have conducted a meta-analysis regarding the efficacy and effectiveness of influenza vaccines. Because no published meta-analyses have assessed efficacy and effectiveness of licensed influenza vaccines in the USA with sensitive and highly specific diagnostic tests to confirm influenza, the authors searched Medline (which contains journal citations and abstracts for biomedical literature from all around the world) for randomized controlled trials assessing a relative reduction in influenza risk of all circulating influenza viruses during individual seasons after vaccination (efficacy) and observational studies meeting inclusion criteria (effectiveness). Eligible articles were published between

January 1st 1967 and February 15th 2011, and used RT-PCR (Reverse transcription polymerase chain reaction) or culture for confirmation of influenza. They excluded some studies on the basis of study design and vaccine characteristics. They estimated random-effects pooled efficacy for trivalent inactivated vaccine (TIV) and live attenuated influenza vaccine (LAIV) when data were available for statistical analysis (e.g. at least three studies that assessed comparable age groups). 5707 articles were screened and 31 eligible studies identified (17 randomized controlled trials and 14 observational studies).

Osterholm et al. (2011) concluded that the efficacy of TIV was shown in eight (67%) of the 12 seasons analyzed in ten randomized controlled trials (aggregate efficacy 59% [95% CI 51- 67] in adults aged 18-65 years). No such trials met inclusion criteria for children aged 2-17 years or adults aged 65 years or older. Efficacy of LAIV was shown in nine (75%) of the 12 seasons analyzed in ten randomized controlled trials (aggregate efficacy 83% [69-91]) in children aged 6 months to 7 years. No such trials met inclusion criteria for children aged 8-17 years. Vaccine effectiveness was variable for seasonal influenza: six (35%) of 17 analyses in nine studies showed significant protection against medically attended influenza in the outpatient or inpatient setting. Median monovalent pandemic H1N1 vaccine effectiveness in five observational studies was 69% (range 60-93).

So, the controversies still remain even if the World Health Organization and the CDC continues to push for widespread influenza vaccination as the most effective means of prevention. The reality shows that influenza vaccines can provide moderate protection against virologically confirmed influenza, but such protection is greatly reduced or absent in some seasons. New vaccines with improved clinical efficacy and effectiveness are needed to further reduce influenza-related morbidity and mortality.

That debate is likely rage for years. Vaccination supporters believe that vaccination is the best way to prevent the disease, because vaccines have a greater positive effect than a negative one, they harm fewer people and it happens rarely. Vaccination adversaries believe that vaccinations are not safe enough for anyone. Ultimately, we are left to make up our own mind about whether to get that shot, or not. But whether flu shots are risky or not for the consumers' health, whether vaccination against flu can harm the human body or not, whether consumer protection policies in that field are efficient or not, will still remain unanswered questions.

2. Materials and Methods

The present study was carried out in Romania, with the intention to cover the point of view of the people, their attitude and motivation regarding the flu shot consumption in the majority of Romanian counties. A survey has been conducted among 303 respondents using the factor analysis. The respondents belong to different social classes: students, employees, self-employed, professionals, retired and housewives.

Based on previous literature review and on market research, the main objective of the study is to identify the most important determinants which make consumers decide in favour or against flu vaccination. More specifically the objectives of the study are:

1. To analyse the behaviour of Romanian consumers regarding consumption of flu shots;
2. To analyse the profile of consumers who are interested (or not) in the immunization against flu;

3. To analyse the consumers opinion regarding the efficiency and efficacy of immunization;
4. To analyse the consumers opinion regarding the potential risk of immunization on the consumers' health and life;
5. To study the impact of education on consumer awareness, attitude and purchase motivation towards immunization.

Sample data

The study is designed to identify, first of all, the main determinants the actual society reveal when deciding in favour, or against the use of flu shot. The results are based on the reply of 303 respondents to a questionnaire distributed through Google docs, consisting of 18 questions. Out of the 18 questions, 9 questions address the main problem of the respondents' opinion regarding flu shot, while the other 9 questions are aimed specially to help us to draw a general profile of the respondents, based on their attitude to flu shot immunization. The questionnaire was active for replies for about 5 months, starting from October 2016 until the end of February 2017. Written in Romanian language, it was mainly addressed to Romanian people, as we do not intend to analyze the national culture impact on respondents' position in relation to the flu shot campaigns.

Generally, there are a lot of determinants which could help to determine the profile of the Romanian consumer who is in favour or against influenza immunization. In our questionnaire, we can identify the following determinants: mass-media, the consumers, perception of the effectiveness or ineffectiveness of the vaccine, the level of trust/confidence in the safety and efficacy of the vaccine, the fear of adverse effects, the families income, culture/education, the social status (social class), the religious beliefs, the influence of the social environment (family, friends, doctors etc), the age, the own perception of the impact of the vaccine on increasing the immunity of the body, a stronger confidence in the natural treatment of influenza than in immunization.

The 303 respondents come from around the country, but the most interested in that subject were people from traditional regions like Ardeal, Banat, Moldova, Muntenia and Transylvania, with about 79% from the total number of answers gathered in the study. The majority of responses came from the urban areas. This fact explained the high percentage of respondents with monthly incomes higher than 2500 RON.

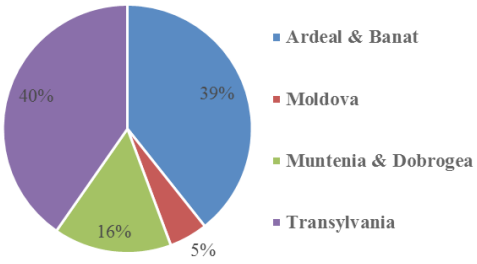

Fig. 1. *Sample distribution by region*

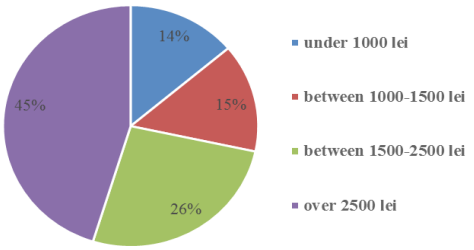

Fig. 2. *Sample distribution by income*

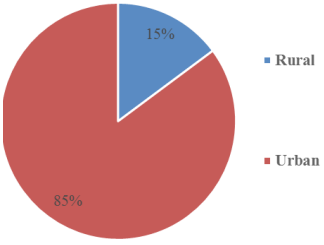

Fig. 3. *Sample distribution by area*

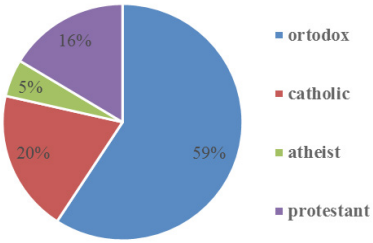

Fig. 4. *Sample distribution by religion*

The sample reflects also the main religions officially recognized in Romania. But somehow, there is unwillingness on the respondents' part when mentioning this detail, because there are 7 answers short. Moreover, the persons declared as atheist (15 in number) seem to reflect more their own beliefs, than any official religion association.

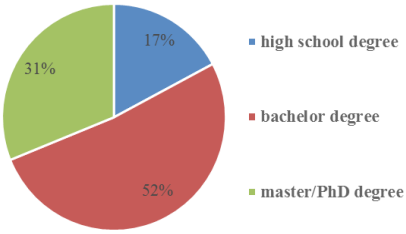

Fig. 5. *Sample distribution by level of studies*

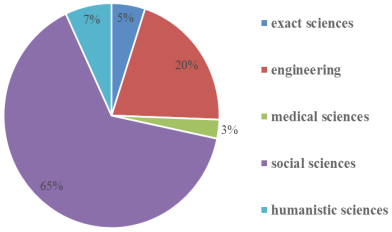

Fig. 6. *Sample distribution by area of studies*

The result of the study reflects the attitude towards the use of flu shots among people with mainly bachelor, master or PhD degree. These people have the knowledge, or at least the understanding that there is need for a more rational approach to this subject, rather than just a profoundly culture-based vision. Fortunately, in our study we also have 7 answers from representatives of medical sciences that might give us fundamental clues about the position towards flu shot campaigns of the most appropriate professionals.

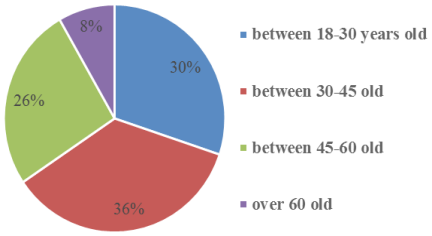

Fig. 7. *Sample distribution by age*

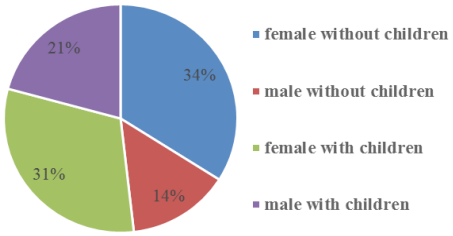

Fig. 8. *Sample distribution by family composition*

There is a higher rate of female than male respondents, no matter if they are parents or not. Furthermore, the respondents without children are mainly between 18 and 30 years old, while the respondents with children are between 30 and 60 years old. This shows an increasing interest in this subject, especially among the young generation. We will analyze furthermore if this generation change of interest is actually influenced only by some core factors, like mass-media, level of information, religion, or maybe there is a wider variety of factors influencing their decision to be in favour or against flu immunization.

Research methodology

The data gathered from the questionnaire are analyzed using the factor analysis. The

answers for each question addressed in the questionnaire, representing qualitative inputs, are translated into quantitative values, in order to proceed to a multivariate statistical analysis that will lead us to the main factors which influence a consumer to be in favour, or against flu vaccination. In table 5 are presented the codification and the main descriptive statistics regarding the respondents' answers, aggregated from the questionnaires. Because of the missing answers concerning the religion of the interviewed persons (7 cases), we select for the final statistical analysis only the answers given by 296 respondents.

Special attention was given to the Likert scale used to measure the respondents' perception regarding the influence of mass-media and social relations on their decision to be in favour or against flu immunization, Howitt and Cramer (2010). We can easily see that each item's *Cronbach's Alpha if Item Deleted* value is less than the total 8 items' *Cronbach's Alpha* value of 0.902, meaning the scale for perception measurement is consistent and reliable.

Table 2. *Reliability Statistics*

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.902	.908	8

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
TV	14.6	44.7	.711	.673	.888
radio	14.8	48.1	.673	.569	.894
press	14.6	46.2	.689	.573	.891
flyers	14.6	45.7	.646	.505	.893
internet	14.3	42.4	.741	.661	.884
doctor	13.3	41.2	.650	.528	.897
family	13.7	40.3	.751	.741	.884
friends	14.1	42.0	.765	.705	.882

Source: calculation with SPSS 20.0

The purpose of the factor analysis is to identify the most important determinants which may influence a consumer to decide to use, or not, the flu shot. First we need to find out if factor analysis is proper for our data. In order to do that, we will use the KMO test results. The KMO test confirms that factor analysis is proper for our aim, as its value exceeds 0.8, which reveals that we will not lose information, but we will reduce the initial decision complexity drastically, with a significance level less than 1%.

Table 3. *KMO and Bartlett's Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.801
Bartlett's Test of Sphericity	Approx. Chi-Square	2483.746
	df	190
	Sig.	0.000

Source: output SPSS 20.0

The output of the main components will be analyzed, first of all, by using Kaizer criteria, which sustains that the principal components are the ones associated with an eigenvalue higher than 1. Secondly, the communalities of each variable against the factor model will be analyzed. Once this

analysis is finished, the next step requires analyzing each factor saturation variable, namely the proportion which explains the variable's variation through the designed factor model. In order to do that, we will group the different variables taken into consideration in the initial factor model, to reduce the 20 factors to a final number of 6 factors, able to explain the sample's variation in a statistically correct proportion. Finally, we will outline the main drivers that should be considered in drawing up a national strategy of immunization against flu, financed not only by the government, but also by individuals who may decide, on own initiative, to choose the immunization opportunity.

3. Result and discussion

We have to state from the very beginning that we are mainly interested in the peoples' perception concerning the efficiency of flu shot immunization. This issue derives from the small number of respondents who accept immunization, because from the total of 303 records, we have only 37 cases using flu shots as immunization option. What is more, *266 respondents do not use the flu shot, while 35 of them consider shot administration as the most efficient way to prevent or cure the flu. This is the main controversy of the Romanian consumers' behaviour regarding immunization against flu.*

Table 4. *Respondent's perception regarding the efficiency of immunization*

Which is the most efficient way to cure flu?	Do you consider flu shot administration risky for your health?	Do you know the side effects of flu shot administration?	Count
Flu Shot	no	no	4
		less information	7
		yes	12
	don't know	no	1
		less information	2
		yes	2
	yes	no	1
		less information	1
Synthetic medicine	no	no	1
		yes	1
	don't know	no	1
	yes	less information	1
Classical natural medicine	no	less information	1
	don't know	no	1
	yes	less information	1

From the 37 respondents who use the shot, only 25 of them consider that their health has been improved. There are about 4 cases where it is mentioned that although flu shot administration is risky, they have chosen to go ahead with the immunization. On the other hand, those 4 cases either do not know, or they have only limited information about the side effects of the shot. In conclusion, we have to underline that persons who generally use the flu shot, base their decision not on the information they have, but on the perception built from different sources, like doctors' opinions, family opinion, mass-media etc.

Table 5. *Descriptive statistics on respondents' answers*

Question summarized	Variable	Codification	Minimum	Maximum	Mean		Std. Deviation
			Statistic	Statistic	Statistic	Std. Error	Statistic
Which kind of treatment do you consider as being the most efficient among the ones mentioned below?	treatment	1 - flu shot 2 - synthetic drugs 3 - homeopathic medicines 4 - natural traditional cure	1	4	2.79	.070	1.210
Are you against or in favour of flu shot?	feedback	0 - against flu shot 1 - in favour of flu shot	0	1	.12	.019	.323
Is flu shot dangerous for your health?	risk perception	0 - yes 0.5 - don't know 1 - no	0	1	.5507	.02314	.39805
Do you know the side effects of flu shot?	information level	0 - no 0.5 - only few 1 - yes	0	1	.4223	.02237	.38494
Do you avoid flu shot because you are familiar with its sides effects?	secondary effects	0 - totally disagree 0.25 - disagree 0.5 - indifferent 0.75- agree 1 - totally agree	0	1	.5557	.01817	.31262
Does advertisement influence your immunization decision?	advertisement	0 - no, 1 - yes;	0	1	.19	.023	.390
On a scale from 1 to 5, please mark how much are you influenced in your immunization decision by the following information sources?	TV perception,	(1) -> 0, (2) -> 0.25, (3) -> 0.5, (4) -> 0.75, (5) -> 1;	1	5	1.73	.065	1.111
	radio perception		1	5	1.47	.048	.823
	press perception		1	5	1.64	.058	.992
	flyer perception		1	5	1.71	.063	1.088
	internet perception		1	5	2.02	.075	1.285
	doctor perception		1	5	2.97	.089	1.538
	family perception		1	5	2.58	.085	1.464
	friends perception		1	5	2.17	.075	1.294

On the other hand, there are a lot of respondents that declared they did not use flu shot for immunization. Deep-diving into the main profile of those respondents, we concluded that religion or the monthly income is not relevant. This convinced us that consumers are not well informed about the benefits and side effects of flu shot administration, being easily influenced in the decision making process.

Table 6. *Respondents' perception avoiding flu shot administration*

Do you consider flu shot administration risky for your health?	Do you know the side effects of flu shot?	Do you avoid flu shot because you're afraid of its side effects?	Count
no	no	totally disagree	7
		disagree	9
		indifferent	9
		agree	4
	less information	totally disagree	6
		disagree	9
		indifferent	5
		agree	2
	yes	disagree	3
		indifferent	2
		agree	1
don't know	no	totally disagree	5
		disagree	14
		indifferent	30
		agree	16
		totally agree	3
	less information	disagree	6
		indifferent	9
		agree	13
		totally agree	2
	yes	indifferent	1
		totally agree	2
yes	no	disagree	1
		indifferent	1
		agree	4
		totally agree	5
	less information	totally disagree	2
		indifferent	8
		agree	28
		totally agree	13
	yes	totally disagree	1
		disagree	3
		indifferent	2
		agree	13
		totally agree	27

Regarding the side effects, 61 respondents have stated that they consider it more efficient to use synthetic medicine, rather than vaccination. Knowing that out of those 61 respondents, only 24 have considered flu shot dangerous, made us conclude again

that people are not properly informed about the benefits and side effects of the shot. We draw this conclusion while taking into account the behaviour of the 62 respondents that consider flu shot risky for the health, even if they don't have enough information about the side effects of immunization. Moreover, from the 266 respondents who didn't use the shot for immunization, there are 88 who say they avoid using flu shot because of its side effects, but they don't have any information at all, or have just little information about these effects.

A general trend among all respondents shows that, homeopathic and classical natural treatments are preferred when choosing the way to cure flu. That is probably why we can explain the low number of positive responses for flu shot administration. But this fact is just a consequence of the situation described above, that shows the need for a more focused immunization campaign coming from governmental and non-governmental agencies, aimed to bring a set of at least some minimal information to the potential consumers, regarding the importance of immunization against flu.

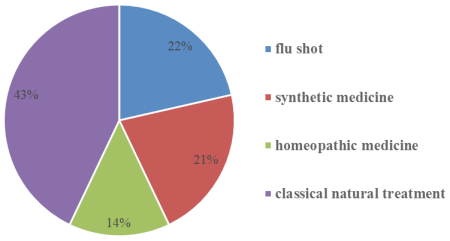

Fig. 9. *Most efficient treatment against flu*

The general picture outlined so far just confirms the fact that people decide to use flu shot only when they build a positive perception about the possibility of getting a shot in their mind. Unfortunately, this perception is less based on self-assessment and individual study, but more on the perception built on a large scale, where mass-media, doctors, religion, the environment and culture have a significant impact on a person's decision to immunize against flu. It is hard for a consumer to take his own decision, especially in a situation similar to the one in our study, where out of 7 respondents with medical education only one prefers flu shot immunization, while the others choose homeopathic or classical natural treatment.

In order to identify the main factors taken into account by the Romanian consumers when opting against flu immunization, we will proceed to a factor analysis that reduces significantly the decision model analysis. We can see in Table 7 that there is a strong correlation between the items we have considered in our questionnaire, such as side effects with risk perception, or TV perception with internet perception, radio perception, flyer perception, press perception, or friends' perception. More than that, when talking about social relations and their influence on everyone's daily decisions, we can see some risk in the case of consumers influenced by friends or family members, which are also influenced by other means of communication, like mass-media. All of these synergies will disappear once we identify the main components describing the *n*-dimensional decision space, where each dimension is a criterion which each individual is taking into consideration in its own decision process.

Table 7. Correlation Matrix

	risk perception	level of information	side effects	advertisement	TV perception	radio perception	press perception	flyers perception	internet perception	doctor perception	family perception	friends perception	monthly revenue	age	level of studies	religion	environment	treatment
risk perception	1.000	.302	*.634*	-.181	-.210	-.166	-.095	-.278	-.108	-.316	-.170	-.152	-.139	-.025	-.096	.073	-.042	.367
level of information	.302	1.000	.247	-.141	-.184	-.067	-.003	-.034	-.131	-.112	-.097	-.147	.036	.085	.033	-.013	-.086	-.072
side effects	*.634*	.247	1.000	-.113	-.044	-.075	.032	-.134	.021	-.194	-.090	-.032	-.145	.056	-.066	.014	-.045	.332
advertisement	-.181	-.141	-.113	1.000	*.602*	*.522*	.359	.489	.434	.280	.327	.367	-.025	-.061	-.077	.001	.088	-.103
TV perception	-.210	-.184	-.044	*.602*	1.000	.709	*.551*	*.517*	*.742*	.432	.493	*.556*	-.085	-.175	-.118	.100	.018	-.119
radio perception	-.166	-.067	-.075	*.522*	*.709*	1.000	*.552*	*.562*	*.586*	.401	.470	*.513*	-.004	-.105	-.044	.054	.023	-.128
press perception	-.095	-.003	.032	.359	*.551*	*.552*	1.000	*.639*	*.656*	.440	.479	*.540*	-.086	-.177	-.150	.040	-.045	-.076
flyers perception	-.278	-.034	-.134	.489	*.517*	*.562*	*.639*	1.000	*.515*	.485	.463	.474	.024	-.063	-.058	.066	.045	-.128
internet perception	-.108	-.131	.021	.434	*.742*	*.586*	*.656*	*.515*	1.000	.467	*.564*	*.587*	-.131	-.268	-.192	.087	.046	-.013
doctor perception	-.316	-.112	-.194	.280	.432	.401	.440	.485	.467	1.000	*.703*	*.597*	-.028	-.216	-.032	.100	.099	-.147
family perception	-.170	-.097	-.090	.327	.493	.470	.479	.463	*.564*	*.703*	1.000	*.813*	-.061	-.139	-.081	.156	.044	-.074
friends perception	-.152	-.147	-.032	.367	*.556*	.513	*.540*	.474	*.587*	*.597*	*.813*	1.000	-.046	-.135	-.008	.094	.045	-.076
monthly revenue	-.139	.036	-.145	-.025	-.085	-.004	-.086	.024	-.131	-.028	-.061	-.046	1.000	.493	*.607*	.128	-.216	-.062
age	-.025	.085	.056	-.061	-.175	-.105	-.177	-.063	-.268	-.216	-.139	-.135	.493	1.000	.334	.030	-.125	.047
level of studies	-.096	.033	-.066	-.077	-.118	-.044	-.150	-.058	-.192	-.032	-.081	-.008	*.607*	.334	1.000	-.016	-.189	.009
religion	.073	-.013	.014	.001	.100	.054	.040	.066	.087	.100	.156	.094	.128	.030	-.016	1.000	-.088	.036
environment	-.042	-.086	-.045	.088	.018	.023	-.045	.045	.046	.099	.044	.045	-.216	-.125	-.189	-.088	1.000	-.042
treatment	.367	-.072	.332	-.103	-.119	-.128	-.076	-.128	-.013	-.147	-.074	-.076	-.062	.047	.009	.036	-.042	1.000

Source: output SPSS 20.0

Our factor analysis shows a 6-dimension spatial decision process, which can explain more than 66% from the total variation within the sample, with the remark that the first component has a major contribution (27%) in explaining the total variation.

Table 8

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	*5.475*	27.377	27.377	5.475	27.377	27.377	4.471	22.357	22.357
2	*2.483*	12.417	39.794	2.483	12.417	39.794	2.432	12.158	34.516
3	*1.881*	9.403	49.197	1.881	9.403	49.197	2.042	10.210	44.726
4	*1.204*	6.020	55.217	1.204	6.020	55.217	1.932	9.660	54.386
5	*1.154*	5.769	60.986	1.154	5.769	60.986	1.268	6.339	60.725
6	*1.027*	5.135	66.122	1.027	5.135	66.122	1.079	5.396	66.122
Extraction Method: Principal Component Analysis.									

Source: output SPSS 20.0

Based on the communalities values, describing the proportion of the variation of each variable explained by the factor model, we can see that neither the religion, nor the living area (rural vs. urban environment) influence the consumer's decision regarding their immunization options against flu significantly.

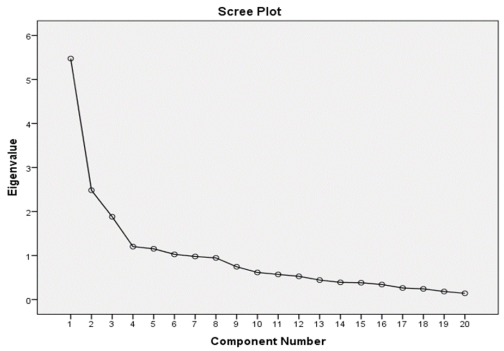

Fig. 10. *Representation of principal components*
Source: output SPSS 20.0

In figure 10 we can see that only the components from 1 to 6 give sufficient explanation of the variance in our sample. That means the variance of the entire sample can be explained in the major part by the variance of those first 6 components. The underlined main components are drawn up from the total initial components considered (consisting of the variable derived from each question of our questionnaire), the ones which have an eigenvalue higher than 1, according to Kaiser Criteria, see Howitt and Cramer (2010).

Moreover, the value of communalities reveals information that can give us relevant clues about the most closely correlated variables that might be grouped under one of the 6 different main components derived from the Principal Components Analysis. For instance, in table 9 we can see this variables bolded, because it is necessary to group them into more synthetic components, able to reflect an aggregate level of factors. This grouping is depicted in table 10 (the Scree Plot), as the value of communalities is not a final criterion to be used when eliminating variables from the final factorial model, because more relevant information is revealed by the following *Component Matrix* and, especially, by the *Rotated Component Matrix*.

Table 9. Communalities

	Initial	Extraction
Risk perception	1.000	***.772***
Information level	1.000	***.724***
Side effects	1.000	***.747***
Advertisement perception	1.000	.611
TV	1.000	***.747***
Radio	1.000	.684
Press	1.000	.647
Flyers	1.000	.649
Internet	1.000	***.720***
Doctor influence	1.000	.694
Family influence	1.000	***.797***
Friends influence	1.000	***.758***
Financial situation	1.000	***.730***
Age	1.000	.624
Gender	1.000	***.867***
Level of studies	1.000	.562
Religion	1.000	*.373*
Children	1.000	.584
Environment	1.000	*.277*
Treatment	1.000	.657

Extraction Method: Principal Component Analysis.
Source: *output SPSS 20.0*

In this table we regroup all the variables, based on their factorial saturations reflecting the Pearson correlation coefficient between each variable with each relevant factor identified (using Kaiser criteria, that keep only components with initial eigenvalue greater than the unit value). Low levels (less than 0.5) reveal a lesser importance of the variable in explaining the total variance of the sample considered.

Table 10. *Rotated Component Matrixa*

	Component					
	1	2	3	4	5	6
TV perception	.836					
Radio perception	.818					
Internet perception	.765					
Flyers perception	.750					
Press perception	.746					
Advertisement	.742					
Monthly revenue		.817				
Age		.761				
Level of studies		.694				
Children		.687				
Risk perception			.828			
Side effects			.825			
Treatment efficiency perception			.659		-.339	
Family perception	.506			.724		
Doctor perception	.426			.650		
Friends perception	.580			.639		
Religion				.455		-.338
Level of information					.809	
Environment					-.398	
Gender						.911

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 10 iterations.
Source: *output SPSS 20.0*

On the other hand, table 10 reveals the coefficients of discriminant functions, each component being described by such a function score. It is essential that, the higher the coefficient is, the more significant will be the variable included in that component's structure. But we can easily see that the variables included in the most significant components, namely components 1 to 4, have relatively similar coefficients.

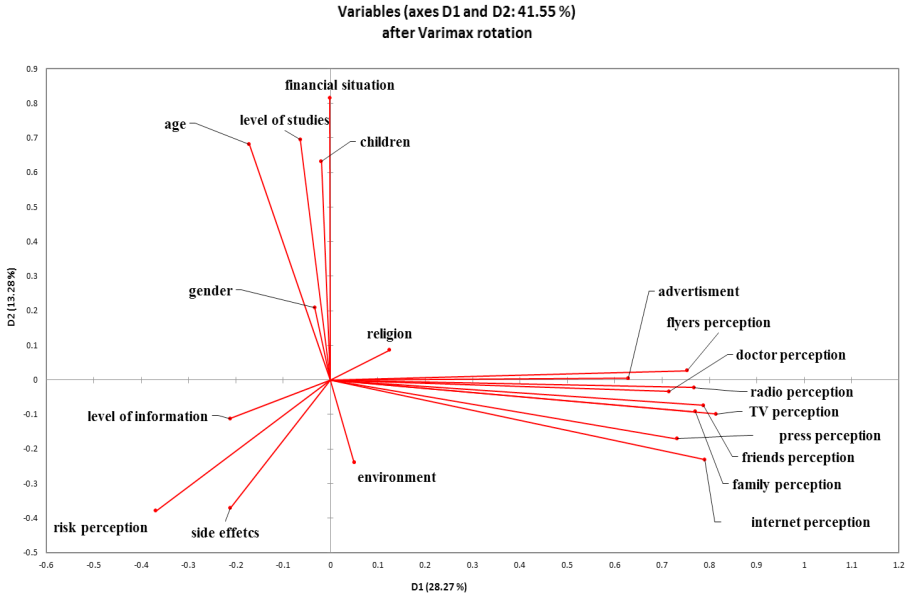

Fig. 11. Spatial dimensions, based on the first two factors

Thus, we can identify as a result of our analysis, the following determinants which have an important impact on the decision making process of the Romanian population, when choosing to opt or not for flu immunization:

» the first factor is the influence of all the means of advertising on the behaviour of the population (TV, radio, internet, flyers and press, as shown in table 2), because factor 1 from table 8 explains more than 27% from our sample variation; in table 10 there is the score composition of factor 1, which shows that TV, Radio, Internet, flyers, press or advertisement have the same influence on the respondents behaviour regarding flu shot administration;

» the second factor reflects the individual profile of the person (financial situation, age, level of studies, with or without children). An exception is the gender variable which is not strongly correlated with factor 2, shown in Table 9 (second column), because its correlation value is not statistically significant;

» the third factor is the risk perception a person may feel when considering flu shot administration, or when accepting a synthetic medicine treatment, as explained at the beginning of this section, mainly driven by the lack of efficient information campaigns, as shown in table 5. When analyzing the score composition for factor 3, as underlined in Table 6

(column 3), the values further clarify this statement;

» the fourth factor is the influence of social relations on a person's decision; that means how much friends, the education received in the family and especially the doctor's role in giving information to the patients may influence the consumers decision; even if religion is correlated with the fourth factor, we will not underline it, because the correlation coefficient is less than 0.5 (table 10) and its variation is not explained by the factor model only by 37.3% (table 9);

» the fifth factor are the information level, the environment (urban or rural area) and the treatment preferred by the respondents, but we will underline as important only the information level that reflects how important it is to be familiar with the side effects of flu shot administration in a person's decision; this way we can see how important it is to inform correctly the population, because of the huge quantities of contradictory information received from different sources. The negative sign of the coefficient for the environment variable, compared with the other two variables included in factor 5, can be explained by a low level of general medical knowledge in the rural area, compared with the urban area;

» the sixth factor underlines the difference between male and female in how they see the flu shot immunization possibility; but as it does not have only a value of 27.7% of communalities with the factor model, we can assume that this is not significantly relevant. The difference between the gender and religion is as expected, because religious orientation groups people with the same opinions on controversial aspects, no matter the gender.

There is not a clear answer to the question whether flu shot administration is opportune or not for people, especially when we talk about administration outside a national programme. But there is certitude that people's opinion about flu shot is extremely subjective and easily influenced by the entourage. That is why central authorities have to run a continuous campaign of promoting the best medical practices in the area of immunization, practices that are scientifically proven. More than that, we would expect professionals to be more active in the media and to facilitate people's decisions - not only through personal views, but using documented and objective perspectives of this controversial topic – in terms of opting for or against immunization.

4. Conclusion and Limitations

Evolution of influenza is so unpredictable that we cannot provide accurate diagnoses based on data from some earlier epidemics. One of the peculiarities of this disease is that it disappears for a long time only to reappear as a widespread epidemic, with higher or lower severity.

The key findings of this study outline the fact that mass-media plays an essential role in directing the debate in favour or against flu shot administration towards a general agreement. This is why we consider decision-makers responsible for regulating this area, which has to be open and transparent, with the support of medical professional bodies and a consistent campaign for promoting health education. This way, we believe a lot of controversial points will converge and public policies in this area will become most effective. But such a scenario is deeply connected with the people's access to different mass-media channels, while the cultural factor preserves its essential role in this equation.

We should underline the fact that the study is limited only to a Romanian people sample that might reflect only a part of the general view towards flu shot administration. For the future we think it would be opportune to repeat this questionnaire after a national campaign should be run by the Ministry of Health, considering the dynamics of the results. It might be opportune to extend our research by choosing to run the questionnaire not only via internet tools, but also using printed files that should be filled out by respondents. The sample should be more balanced when talking about distribution along the historical regions we've considered. And last but not least, we really believe that a next similar research will show an improved medical professionals' opinion, first through a wider sample of people with medical education included in the sample, and secondly, through a set of interviews with several key decision-makers in this area and in the area of medical processes regulation. At least, those interviews should be balanced by opinions of some of the key persons that are strongly against flu shot administration. Such a large research needs the local and central authorities' support.

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