UNIDAD EDUCATIVA PARTICULAR JAVIER
BACHILLERATO EN CIENCIAS

MONOGRAPH

"Complications in fetuses and neonates due to the lack of knowledge about the blood types and the disease they cause called erythroblastosis fetalis"

STUDENT:

Amira Mohauad

ADVISER:

Lcda. Natalia Patiño

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Gratitude

I want to thank God and my family, especially my parents Mansur Mohauad and Sandra Valverde and my brothers Juan Mohauad and Andrés Mohauad who were always willing to give me a hand, advise me and guide me from the beginning to the end of the whole process, supporting me as much as possible. I also thank my teachers Patricia Sanchez and Natalia Patiño who pushed me and helped me to make my work more effective and finally but not less I want to thank my friends that helped me when I needed the support.

Summary

This monograph has a great impact on a social and medical level since it talks about a current disease that affects fetuses and neonates either mildly or in an extreme way. This disease is called Erythroblastosis fetalis and is caused by a blood incompatibility specifically the Rh factor, between the mother and the fetus. This disease destroys the fetus from the inside due to the destruction of its blood cells. This happens because we do not all have the same blood type. There are 4 main groups A, B, AB and O but these are not all compatible with each other and if you receive blood of a type incompatible with yours may cause the death of the person who received the blood. In the case of the Erythroblastosis fetalis the mother and the fetus have a different blood type so the antibodies of the first one consider the blood of the fetus as a foreign substance, which is why they attack and destroy their red blood cells, causing several problems such as severe anemia and the increase of bilirubin, situations that if not treated in time could lead to the death. This disease is not well known and is what makes it more dangerous since according to several studies and hospital records there are several cases of this disease in the country.

But actually this has a cure and can be easily prevented thanks to the increase of technologies and new processes to determine blood groups, but the problem is that in most cases, people do not even know the existence of this and much less know if the child is likely to be born with this disease or the risks that run so they do not attend the doctor in time giving way to the disease reach more serious levels, increasing with this the number of deaths of fetuses in the country, which is already quite high.

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Introduction

The present monographic work is an investigation about the complications in fetuses and neonates due to the lack of knowledge about the types of blood and the disease they generate called erythroblastosis fetalis. The specific study of the subject has a huge importance because it explains the risks and complications on the Rh incompatibility at the time of having children, in order to avoid and prevent the disease or death of fetuses and newborns, and seeks to analyze what is known about this topic and if people are aware that it is necessary to know the blood type of the couple to avoid the possibility of the child suffering from this disease.

Nowadays there are not as many deaths due to blood transfusions as used to happen in ancient times, but there are still diseases caused by blood incompatibility of which we are not very aware of and this work seeks to inform before it affects the fetus to avoid complications in the newborn who are dying in a lot of quantity around the world even though almost all of this death could have been prevented with health care and concern.

There are several studies on this subject in which the illness and the death of newborns are discussed, because not many people know about it for example María Yuliana Díaz with her thesis “Erythroblastosis fetalis: risk factors and Complications, March to December 2014 in hospital gineco-obstrétrico Enrique Sotomayor " talks about the cases of this disease in a hospital in the country and explains the symptoms, causes and consequences that this brings.

The Rh blood incompatibility entails a disease called erythroblastosis fetalis or hemolytic diseases of the newborn that affects fetuses and neonates mainly due to the lack of knowledge of the parents about their blood type because if they are incompatible among themselves the fetus will have high probabilities of being born with a type of blood that is opposite to the one that the mother has, causing several complications during and after pregnancy and if not has being treated correctly, might die.

The monograph will consist of 3 chapters: the first one deals with the types of blood and the compatibility and incompatibility between them and its importance; the second speaks of the diseases named erythroblastosis fetalis caused in the fetus because of this blood incompatibility; and the third chapter talks about the statistics of how well-known and frequent is the disease, and will also include interviews with doctors and surveys of students.

Chapter I

Blood groups

This chapter seeks to explain why it is important for everyone to be aware of how blood types work in our system. People should be aware of the blood types and which ones are compatible or not with theirs since there are many complications due to blood incompatibility, which not everyone knows about and because of this lack of knowledge people can suffer diseases and situations that affect not only the patient's health but others.

1.1 Classification of the blood types

Now, in any medical process doctors will always ask for the blood type. This is because it is essential for a patient's health knowing about this before any surgery since it cannot be applied randomly, even if it seems the same blood for all because actually, it is not. Plenty years ago an avowed doctor realized that the blood reacted in different ways in certain people, because some patients at the time of a blood transfusion came out unharmed and recovered perfectly, but others died instantly converting this process into a medical intrigue.

Because of this and looking for a way to avoid these deaths, according to Reid, M. E., Lomas-Francis, C., & Olsson, M. L. (2012), "By the year of 1900 the scientist and Doctor Karl

Landsteiner through the analysis and observation of the blood agglutination by mixing the blood of a large group of people" (p. 27). Discovered that there was not only one type of blood but that there were several, determining the blood groups that we know nowadays.

1.1.1 ABO.

As explained by Sarhan, M. A., Saleh, K. A., & Bin-Dajem, S. M, (2009) the distribution of Blood types occur because of sugars called antigens that are found on the surface of the blood. An antigen is any substance either external or generated by the body that produces antibodies which are responsible for the protection against foreign substances that can affect health. There are 2 antigens in the red blood cells. The antigen A that produces antibodies called Anti-B and the antigen B that produces antibodies called Anti-A. Depending on which antigen the cells have, the blood type will be determined. Therefore, our blood comes into 4 main groups:

- Group A: Only have antigen A.
- Group B: this is the opposite of the first, are the people who only have the B antigen.
- Group AB: Have both antigens in their red blood cells.
- Group O: does not have an antigen.

This discovery saved, saves and is going to keep saving many lives because due to this doctors can determinate from birth to what group you belong. Now most of us are aware of our

blood type. For example, in a survey applied to third-year students of the baccalaureate in Colegio Javier only 20% of the sample does not know their blood type, while 72% of them do. Among the people surveyed the blood type was asked to observe which was the most repeated in the sample, which was the o + since 68.9% of the respondents had this type of blood.

1.1.2 Rh factor.

In the body, there is a wide variety of antigens, either in the blood, in the cells, or in the systems. But, in our blood, the most important ones are the ABO and the Rh factor because those antigens can produce several problems if they aren't combined correctly. The Rh factor is a protein that was discovered by Wiener and Landsteiner in 1940. They named it like this because they founded it when they were experimenting with rhesus monkeys. According to Florence Cavanagh (20007), "The 85% of the white population possess the Rh factor in their blood, those who have it are called rhesus positive (+) and those who don't are called rhesus negative (-)" (p.16).

There is no problem if you are Rh (-) but you need to be more careful because if you come into contact with other types of blood it could involve many complications since the negative has antibodies that can destroy what is considered external to the body. In this case, it is the Rh (+) inasmuch as they are incompatible as well as many of the blood types known.

1.1.2.1 Importance of blood compatibility.

As explained before, there are four different blood groups and each of them can be Rh positive or negative so that makes eight combinations: A+, B+. AB+.O+ and A-, B-, AB-, O- They all react in a different way depending on which antibody they have. For example, according to Cavanagh (2007) if you are A you have an antibody called anti-B so if a B donates blood to you, the antibody will detect it as an enemy and will try to destroy the red blood cells. So the type that is incompatible with A is B and vice versa.

The AB+ type has no antibody and that's why it is considered the universal receiver. These people can only donate to AB+ because if he/she donates to a B the anti-A will attack the A antigen of the AB causing the agglutination of the blood. The O- has antibodies for every antigen for A, B and, Rh so it only can receive blood from O- Since it does not have an antigen, it can be donated to everyone, and so it is considered the universal donor.

If the situation is analyzed there is a huge lack of knowledge on the subject due to the fact that a lot of people don't care about the types of blood that can truly affect them. The types that are incompatible with theirs. For example, in the survey previously mentioned most people knew their blood type but now the question change, asking if they know what types of blood are incompatible with theirs. The results of this question were surprising since the half of the sample,

50% of it said no and only 28% of them knew the right answer. Demonstrating with this the lack of interest people put into the subject, incrementing the possibilities of diseases and deaths due to blood incompatibility because is through this that people can determinate to whom they can donate and from whom they can receive without any repercussions.

All of these issues due to blood incompatibility do not always occur because of transfusions as most people believe, It can also be from other factors such as inheritance and incompatibility between progenitors where even if it doesn´t look like can affect others like in the case of a pregnancy can affect the newborns and fetuses causing the death of babies all around the world and increasing the mortality rate of these unnecessarily.

Chapter II

Blood incompatibility disease

2.1 Deaths of newborns

One of the main objectives around the world is to reduce the number of deaths in each country. A small change has been seen in certain countries or in certain areas, but in most cases no. For example, the number of deaths of newborns at the world level is currently very high and instead of decreasing it is in continuous growth, as well as explains a study carried out by the United Nations International Children's Emergency Fund (UNICEF) which states that it can be Observed that the number of deaths of children in the worldwide is lower than in past decades but the death rate in neonates has a minimum or almost no reduction, which causes a lot of uncertainty since most of these deaths could be prevented, but despite this the number of Stillbirths, which refers to the fetuses that die in the last trimester reaches a figure of up to 2.6 million.

Many times these deaths are due to lack of education, care and even concern on the part of the parents during pregnancy since there are certain factors that must be taken into account to avoid complications and to obtained that both, either the child and the mother leave unharmed from the gestation process. If these factors were previously analyzed by all the couples, if all the corresponding checks were done in time, and the necessary care to give birth to a child would be

Taken, the number of deaths of these would fall in large quantities since in many cases it is not the disease that kills but is the lack of knowledge and interest that actually do it, things that cannot be treated in a hospital.

This is not always understood and is blamed on medical malpractice, hospital conditions, the economic situation of the country and many other characters that although they affect and add up the number of deaths, they are not always the main ones causing these. Sometimes it is also the patient's fault, and good doctors have been accused and defamed by these when in fact the case was not in the medical hands but in the personal care and interest that a person must have for himself and for his health.

2.2 Erythroblastosis Fetalis or hemolytic disease of the newborn

An example of diseases that could be avoided if there was a change in the mindset of people is a disease called erythroblastosis fetalis or hemolytic disease of the newborn which is a blood disorder that affects the fetus if the mother's and the father's blood are incompatible The blood of the fetus is obtained through the inheritance of a gene either from the father, the mother or the combination of both. In most cases, it is not known exactly what the blood type of the fetus will be since it depends on the probabilities of genetics and the blood of the parents.

2.2.1 Symptoms.

This disease can be a little bit tricky because in some cases it occurs very lightly and is treated easily but in others, it can cause death or leave serious repercussions in the future. As explained by Arevalo, Arévalo, Bellazzi, &Zanazzi (2009) The main symptoms are: fetal anemia due to the fetus has a minimum amount of red blood cells compared to what a healthy baby should have since the mother's antibodies attack and destroy them considering them as a threat or a foreign substance to the body causing other complications in the fetus. For example the liver stop working as it should because when it detects the decrease of the red blood cells it stop doing other process and focus only on the production of them, heart failures since the blood is not capable of transporting oxygen to the heart with totality, etc ; And hyperbilirubinemia, which is the production of excess bilirubin. When it cannot be expelled, it goes into its most severe form, jaundice, which causes a color change in the fetus to a yellowish tone and could cause mental retardation and a physical disability in the future.

2.2.2 Preventions.

In situations like these if the patients as a first step had planned the pregnancy and knew their blood type, the results could have been different since if they attended to the doctor constantly they would have had a blood incompatibility test where they could realize the incompatibility that There is among them and if this were positive, the doctor would inform the couple from the beginning about the risks and complications that the pregnancy could have, more controls would be carried out, would have explain the care they should have, the way to proceed and other

important recommendations for the child, despite of having a high probability of suffering from the disease, could be born healthy and without complications, but unfortunately the reality of our country and even the world is very different.

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A large number of women do not plan their pregnancy, they don't even know who the father is, much less know their blood type preventing the doctor to determine if there is an incompatibility between the parents and if the child is not taken cared during and after the pregnancy, the baby or the following ones could die from this disease because if it is not treated in time it can be very dangerous as mentioned by Díaz Garay, MY (2015) "Hemolytic Disease Rh isoimmunization decades ago was one of the main causes of death and injury brain in the newborn "(p.13).

2.2.3 Diagnosis.

Many times symptoms can say that something could go wrong in the fetus, so in these cases a specific procedure called spectrophotometry is used. “This process as explain by Lewis, F., Schulman, H., & Hayashi, T. T. (1964) “Gives reliable prediction of the severity of the hemolytic process of the fetus: peaks of 5 units or less show infants with minimal or no evidence of hemolytic disease; peaks greater than 5 units were associated with increasing the disease Rhesus-sensitized woman.”(p. 4). This helps the doctor for the diagnosis and treatment due to

this determinates which patients are in more danger than others and help him/her deciding of what treatment the patient could get.

After analyzing all these symptoms and what is at risk, The doctors will try to cure the baby, If the disease has been detected before birth, by intrauterine blood transfusions and if the treatment goes as planned decrease the Main symptoms mentioned above and through a vaccine that has help reducing the number of cases of erythroblastosis fetalis being able to save babies lives, but if the situation is analyzed from another point of view it could be observed that resources and time that could be applied in treating more critical patients are spent in curing a disease that could have been avoided from the beginning only with a greater knowledge about it, which is currently very scarce.

Chapter III

Medical records

3.1 Percentages of knowledge about the disease

Ecuador is a country with many virtues and defects but when talking about health we can say that one of the great defects that it has is the lack of knowledge of most people about diseases and how to act before them. For example, the aforementioned disease does not receive the importance it should and not because it is not considered important or risky but because it is not well known by Ecuadorians and especially in the poorest places or in the marginal areas of the country that know little or nothing about blood types and their incompatibilities.

But it is not only in these parts of the country that ignorance is observed to prove that in more civilized parts of the country this ignorance is also present a survey was carried out to students and teachers of the school Javier asking them if they had heard about a disease called erythroblastosis fetalis, This particular question was for the purpose of analyzing how many people in the school know about the disease and to compare what is the highest percentage, those who know or those who don't.

The results showed that this is not a really known disease due to only 8% of the entire sample said that had heard of this disease leaving us with a high number, exactly 88% of people who had

never heard anything about it but the good part is that the next question showed that there were people that was interested about the topic and want to know more about it due to 92% of the sample considered important and only 6% of it did not.

3.1.1 Percentages of the Rh factor in Ecuadorian hospitals.

With these data we realize that very few people know anything about erythroblastosis fetalis and therefore it is believed that this disease does not exist or that it is not common in the country but that's not true since according to some data, it has been found that although there are not many cases of this disease anymore there are hospital records that prove that it continues affecting the Ecuadorian population.

Some hospitals have this information such as the hospital José María Velasco Ibarra as explained by Andocilla, B., & Fernanda, M. (2014) "42 patients presented maternal-fetal blood incompatibility, of which 2.81% presented Rh incompatibility with a greater frequency of 3.60% in the mestizo ethnic group "(p.18). Or as in the Isidro Ayora Gynecological-Obstetric Hospital of Quito "Of the 575 medical records that had been reviewed in the period from January to December 2015, the erythroblastosis fetalis frequency was determined with 16.68 %. The ABO incompatibility had 79 cases (81%) and the Rh incompatibility 18 cases (18%) "Albuja, Aguilera, DE, &PozoDíaz, KG (2017). With this information, we can know that in more than two hospitals patients registered with this disease have been seen demonstrating that it's a common situation to see this kind of cases all over the country and the world.

3.2 Medical experience

To understand a little more about the disease, an interview was make to a doctor who had the opportunity to see and treat patients with erythroblastosis fetalis from first hand. Dr. María Yuliana Díaz Garay who currently works in the SOLCA hospital, she tells us about her experience at the "Centro de salud unidada Gualaceo" where she carried out the rural one in 2015. Through this interview tells us that she knew many cases of pregnant women who did not know her blood group or her couple blood type, she explains that When they were first-time pregnant women, they were considered to be patients with a high-risk factor for probable cases of fetal erythroblastosis, and in the three months that she was exercising in a certain place, she had the opportunity to witness and treat 5 cases with all the signs and symptoms of the disease.

Dr. Díaz commits that after the arrival of a patient with these symptoms and after performing all the corresponding examinations and analyzing if the couple had different blood groups, the mother was sent for more specialized controls to specific centers such as gynecology and pediatrics where they manage to make them known, in the case of being incompatible, the treatment they could follow. As advice to patients, it is concluded that in order to prevent the disease, maternal controls should be given since pregnancy is known and her advice to doctors is that blood tests should always be done to parents in order to have an approximate result of the

child's blood and in case there is a difference between these apply the vaccine and the established procedure.

Conclusions

At the end of this monographic work, it is concluded that:

- The variety of blood types causes not all of us to be compatible with each other, since not having the same types only certain people can receive certain depending on whether they are compatible or not and it is that is called blood compatibility.

- It is essential for our health to know our blood compatibility since there is a great variety of people, not only in Ecuador but in the world that does not give importance to the types of blood and the consequences that the wrong type of blood in the body can entail, but often this is not due to the lack of interest but rather to the lack of knowledge that is had regarding these.

- Erythroblastosis fetalis is a disease that attacks the red blood cells of the fetus because the mother has the Rh negative factor but the fetus the Rh positive factor. This is common since there is a large number of people with the Rh factor in the blood so the probability that the baby is born with this is high if the father also has it, so There have been several cases of this disease in hospitals in our country and some deaths of fetuses and neonates because of this over the years despite is not difficult to heal this, since in many cases the parents do not realize that their child could be born with this disease that acts stealthily in the fetus.

- Some diseases could be healed easily or even prevented if patients pay more attention to their own health and that of their relatives and do not wait until the last minute or until the disease is more advanced to take serious measures or assist the doctor.

- People are open to the idea of learning new things and to take the necessary measures to save their lives and that of their relatives if they are at risk but for this, they must first be informed of the dangers that the disease brings. With the mortality rate in fetuses and neonates could be reduced, since doctors and patients will be co-operating with each other, and avoiding some deaths.

Recommendations

At the end of this work, it is recommended

- Educate in homes, schools, public institutions and other places to young people, women, children, parents, etc. about the importance of blood groups, the diseases they cause, who can be donated and who cannot and all that is related to blood types due to lives can depend on it.
- Before forming a family, know and take the necessary care for a pregnancy and not take it lightly because there are two lives at risk that should be taken care of since the beginning of pregnancy. Make sure that there is not going to be any complication at the blood level and if it is known that there is an incompatibility between the parents and a high probability that the fetus has the disease go to the doctor, Assist to all the respective checkups and follow the medical instructions to hope it does not get to something more serious and try to prevent the disease as soon as possible, for the mother to have a safe and uncomplicated pregnancy
- I also recommend the doctors to have patience and to take time to explain their patients the risk, consequences and ways to treat some disease with words and methods they can understand because there are a lot of people who are interested and consider it important to know about the blood incompatibility and are willing to improve their lifestyle in order to reduce the mortality rate in neonates but they just need someone to teach them how to do it.

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Annexes

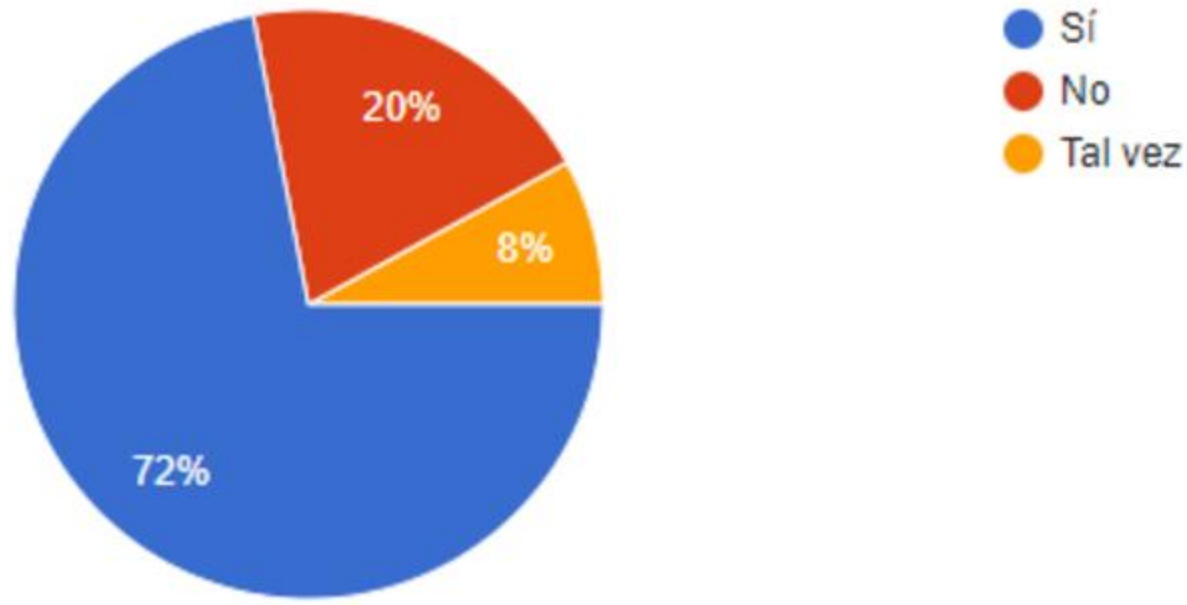

Image 1: Do you know your blood type?

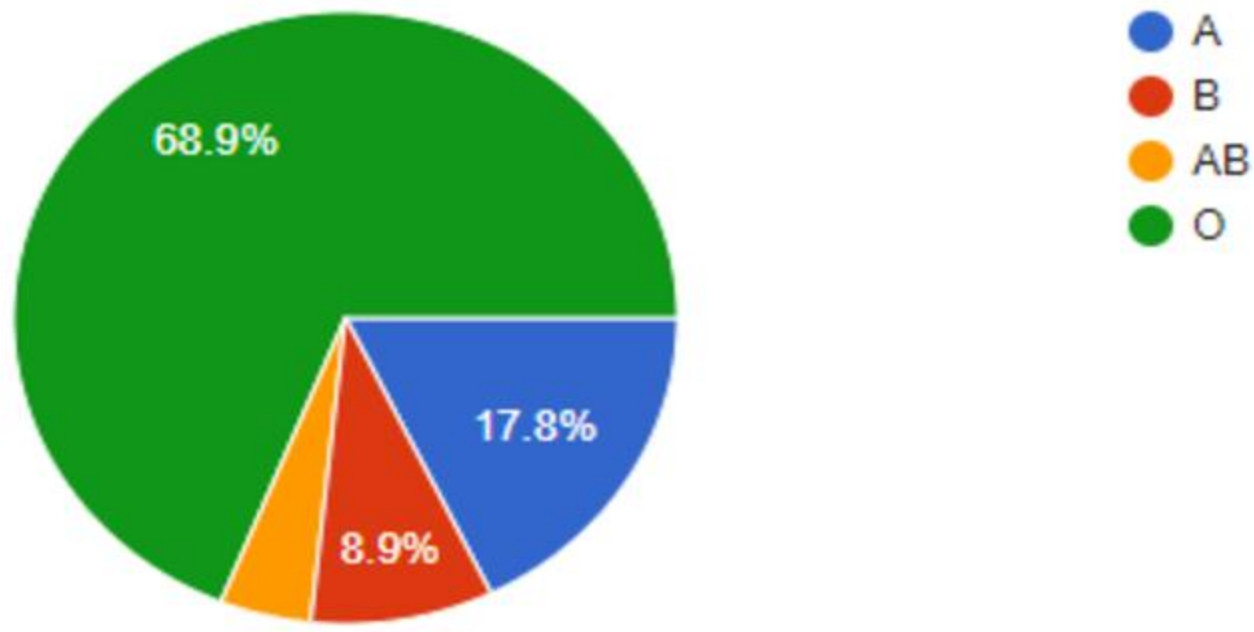

Image 2: what is your blood type?

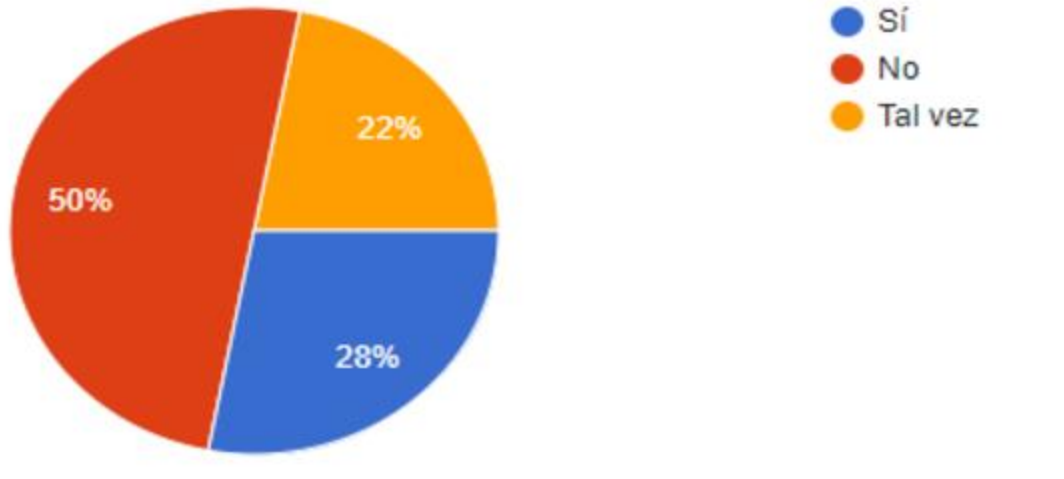

Image 3: Do you know what types of blood are incompatible with yours?

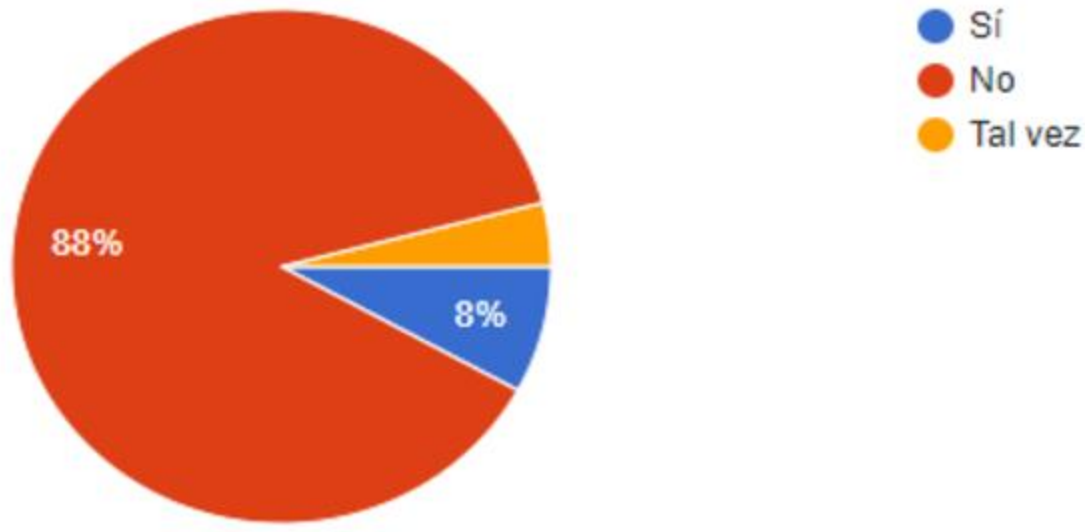

Image 4: Have you heard of a disease named erythroblastosis fetalis?

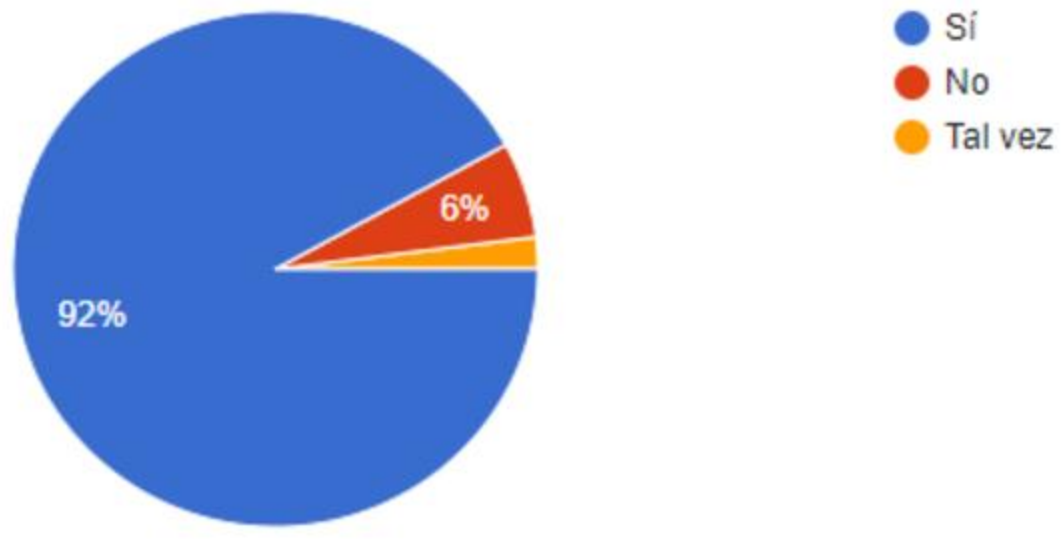

Image 5: Do you consider important to know about this?