Beliefs about the Effect of using Blood Donation Payments: Survey Results from Norway

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Master Thesis

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Abstract

BACKGROUND: The scarcity of blood is and has been a global problem. Efforts to increase the supply of blood have become a priority issue for every nation, so that the rising demands for blood are sustained. The most commonly used method of blood donation worldwide is voluntary (unpaid) donations, however, in order to increase the supply the use of financial incentives has been suggested

OBJECTIVE: To investigate to what degree people believe that higher payments for giving blood will lead to more people donate blood, and to determine what socio-demographic factors that affects such beliefs (gender, age, education and income)

METHOD: Cross sectional data collected from the 20 counties of Norway on beliefs and socio-demographic factors such as gender, age, income and education level is used. Pearson Chi-Square tests and Multinomial Logistic regression analysis are used to investigate the research questions.

RESULT: We found that a majority of the sample believed that paying for blood will lead more people to donate. Furthermore, age was found to play a significant role in explaining the beliefs about the effect from using blood donation payments. Younger age groups believe more than older age groups that paying for blood will increase the recruitment of blood donors. There are some indications that women, less than men, believe in that paying for blood will increase the number of blood donations.

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Personally I am deeply grateful to my parent for being caring parents from my childhood times to this day, thank you, I can't pay your care on this earth. God bless you.

Finally I owe my deepest gratitude to my dear wife Shally whom I love most and my daughter Mushtaaq for their patience throughout my study period. Thank you both patience pays.

Salad Anshor Ali Oslo, 15th may 2013

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Abbreviations and acronyms

GMP	Good Manufacturing Practice
NOK	Norwegian Kroner
SEK	Swedish Kroner
RHAS	Regional Health Authorities
TTI	Transfusion-transmissible infections
WHO	World Health Organization
NBH	Norwegian Board of Health

1. Introduction

For millions of people worldwide whose lives depend on blood transfusion, blood is not fully available and can be unsafe (Fayoumi, 2011). Over 1 million blood units are annually collected on global basis, however, more units of blood are needed to cope with the increasing global demand for blood (Buciuniene et al., 2006). The increase in the demand is caused by population growth, a higher life expectancy, urbanization and an increase in accident rates (Shahshahani et al., 2006). Although blood donations also are increasing, it is likely that the current rates will not sustain the future demand for blood (Shahshahani et al., 2006).

The use of voluntary blood donation is the most common method, but it is believed that this alone cannot meet the increasing demand for blood. In the debate on how to increase the future supply of blood, the use of financial compensations has been proposed. However, there are potential problems associated with such a method since the risk of contracting infectious diseases could increase and since many researchers believe that compensating blood donors financially, in fact, may decrease rather than increase the total supply of blood due to the potential presence of crowding-out effects. Most of the literature on blood donations focuses on the identification of factors that affect blood donation rates. Important results from these studies are that factors such as income, education, gender and age all predicts the probability of being a blood donor.

In this paper, we are concerned with the beliefs about the effectiveness of blood donating incentives behavior in the general population. The research questions are as follows;

(i) Do people believe that higher payments for giving blood will lead to more people to donate blood?

(ii) What factors may explain peoples' beliefs?

In answering the above questions I have applied data from a survey carried out in the months of February and March 2007 that includes 743 adults Norwegians (between 17-80 years). As concerning the first research question, we know, for the time being, that in Norway blood supply depends on a primarily voluntary donation system. As for the second research question, the focus will be on factors that from the research literature have showed to play a role for actual blood donating behavior such as gender, age, income and education.

Section 1 introduces the paper. Section 2 acts as a background for this study. This section describes how the collection of blood is organized across the world as well as referring to some of the literature on blood donation behavior. Section 3 discusses some of the theoretical literature discussing the incentives for blood donation with a focus on possible crowding-out effects. Section 4 presents data and the statistical methods applied in this study, while section 5 present the main findings. Section 6 is a discussion of the results, while section 7 concludes.

2. Background

2.1. Demand Versus Supply

The primary aim of blood services is to meet the demand for blood and blood components. This is often done via voluntary blood donations combined with an effective inventory management and the appropriate use of blood and its alternatives (Contreras, 2009).

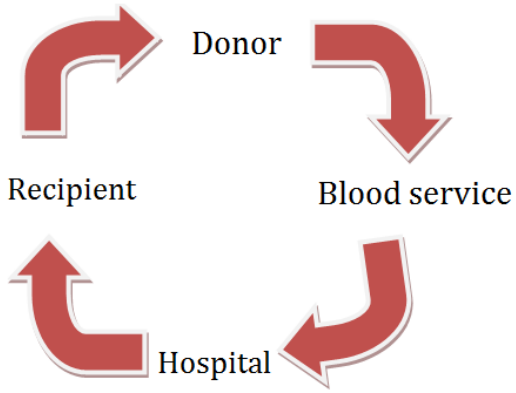

Figure 1: The blood supply chain (Contreras, 2009)

Contreras (2009), Presents the "blood supply chain" that consists of the four following types of agents: (i) donors, (ii), the blood service, (iii), hospitals, and (iv), the recipients of blood (see table 1). The main responsibility of the blood service is to keep production losses as low as possible by use of good inventory management methods in conjunction with hospital laboratories while clinicians are responsible for prescribing blood only when there are no other options available. According to Contreras (2009), the demand for blood is not easy to predict due to factors such population demographics and technological changes. The demand for blood is for example reduced due to improved surgical and anesthetic techniques. Examples here are the treatment of correctable anaemias in pre-assessment clinics, the use of antifibrinolytic agents and intra-and postoperative cell salvage. In addition, investments into

artificial blood could also increase the total blood supply.

Blood transfusions are carried out globally, but their availability as well as quality varies significantly across regions and countries. Worldwide, approximately, 75-90 millions blood units are collected annually (McCullough, 2012). The World Health Organization (WHO) predicts that 1% of the population should be blood donors in order to cope with a country's basic requirement for blood. The minimum requirements are somewhat higher for countries with advanced health care facilities (WHO, 2010).

The average blood donation rate is 15 times higher in developed nations compared with developing ones. More than 70 countries have a blood donation rate below 1% (WHO, 2010). The annual blood requirement rate in Africa is about 8 million units on the same time as the actual rate is only 3.2 million units (41.5%). In South East Asia, 7 million units of blood are collected annually while 15 million units are the minimum requirement. Globally more than 81 million blood units are annually collected but only 45% of these are donated in very populated countries (WHO, 2010).

In recent years, three problems have emerged that increases the risk of inadequate blood supply. First, technological innovations in surgery and oncological therapies have resulted in more aggressive medical treatments. Second, "there is a general tightening of donation eligibility criteria such as stepped-up travel restrictions and restrictions due to the Creutzfeldt-Jakob disease" (Goette and Stutzer,2008 p,1). Third, there is a seasonal shortage due to seasonal variations both in the demand and supply of blood (Goette and Stutzer, 2008).

2.2. Types of Blood Donations and Collections Schemes

The structure and blood collection schemes differ from country to country. Currently, three main types of blood collection schemes are used in Europe. In countries like Britain, France and Ireland, the National Health Service is solely responsible for the collection of blood. In Germany, Belgium, the Netherlands and Luxemburg, the Red Cross has major responsibility with some additional supply from some small blood banks. In Italy, Spain, Denmark, and Portugal, both large voluntary organizations and blood banks administer the collection of blood with some assistance from smaller organizations and hospitals (Bani and Strepparava, 2011).

The international export of blood from third world countries prompted the WHO to suggest that national blood services only should carry out voluntary (un-paid) blood donations so that blood safety is ensured (Jones et al., 2003). Furthermore, the European Union Blood Directive of 2005 included a paragraph that promotes unpaid blood donations. However, it is not always clear what constitutes an unpaid donor since definitions may differ across countries. For instance in Denmark, donors are not financially compensated even for time costs and travel expenses (Vox Sanguinis., 2006). In some countries only bone marrow and stem cell donors are being compensated for time costs, travel expenses and accommodation costs. In other countries again time costs and travel expenses are being compensated for all types of donations. In Switzerland, financial compensations are not used, however, blood donors are given a gift for every 25th donation representing a maximum value of $100 after 150 donations (Vox Sanguinis., 2006 p, 63).

2.2.1. Voluntary (Unpaid) Blood Donations

Smith (1981 p, 23), Defines "volunteer as individual engaging in behavior that is not bio-socially determined (e.g., drinking, sleeping), nor economically necessitated, (e.g., paid job, house work) nor socio-politically compelled (e.g., paying ones taxes, clothing oneself before appearing in public), but rather that is essentially (primarily) motivated by the expectation of psychic benefits of some kind as the result of activities that have market value greater than any remuneration received for such activities". In this aspect defining voluntary does not focus on relationship between altruism, unlike many other definitions of volunteerism (Smith, 1981).

Olson (1965), states that individuals can be expected to act consistently with the interest of the group to which they belong. In the absence of incentives, wealth-maximizing individuals are not likely to contribute to activities that will benefit all individuals, and rather choose to "free ride" on the contributions of others. However, many human beings also engage in acts being costly to themselves in order to help others in need. They vote, donate fund to political organizations, donate blood, and participate in rescue squads (Tirole and Benabou, 2005).
A survey done by Alessandrini (2007), reviews research on the social factors behind donating blood voluntary. A main finding is that altruism is the most important social factor.
Figure 2 below shows the distribution of voluntary (unpaid) blood donations in different regions of the world. It is observed that voluntarily (unpaid blood donation) blood donations are more common in developed countries than in developing nations.

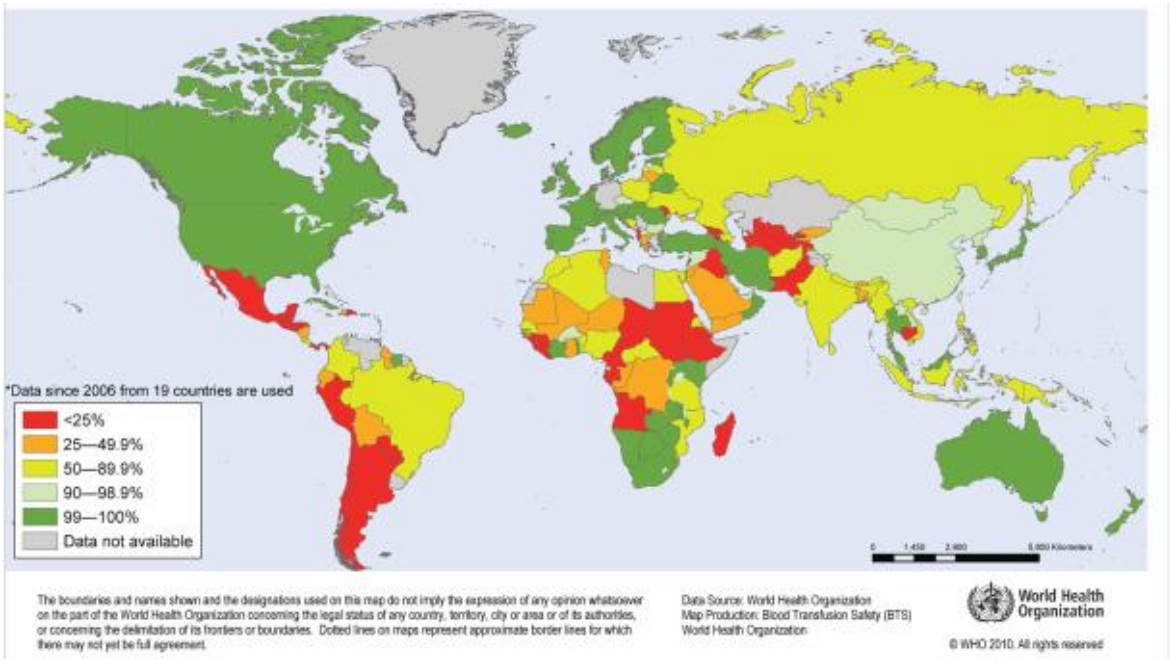

Figure 2: The distribution of voluntary blood donations

Source: WHO (2011)

2.2.2. Family and Replacement Donations

Family and replacement donations is a blood donation mechanism where a family member donates blood to his next of kin or to his/her community whenever a need arises (WHO, 2010). In some situations, a patient in need of transfusion must recruit a given number of replacement donors before getting access to donated blood. Even if the blood donors are not officially being given any financial compensations, it is likely that "hidden" payment are used (WHO, 2010). Some patients prefer blood donations from close family members or from friends, believing that such donations reduce the risk of contracting infectious diseases, however, infection rates are in fact highest for family and replacement donations (WHO, 2010).

2.2.3. Paid Blood Donations

Paid donations are used by blood donations that are given in exchange for a fixed fee (financial compensations). Paid blood donors are often regular donors that contracts with blood banks (WHO, 2010). In some cases, such blood donors may give blood to more than one blood bank.

2.4. The Risks of Blood Infectious Diseases

Following international guidelines, all blood banks worldwide are obliged to carry out a set of procedures that keeps the blood supply free from infections (Goncalez et al., 2010). These procedures are carried out irrespective of being paid donations or voluntary donations. For developed countries, no study confirms a relationship between paid blood donations and the risk of infection. However, the risk increases with an increasing number of first-time donors (Jones et al., 2003).

The diseases that are seen as transfusion-transmissible infections (TTI) are Human Immunodeficiency Virus (HIV), Syphilis, Hepatitis B, Hepatitis C and Human T-lymph Trophic Viruses (Goncalez et al., 2010). In the case of HIV, screening for antibodies leaves an immunologic window period (i.e., the delay between a newly acquired HIV infection and the development of sufficient levels of antibodies for detection) (Goncalez et al., 2010 p, 1806). More than13 millions units of the 75-90 millions blood units being collected each year are not tested for HIV, Hepatitis C Virus, Hepatitis B Virus or Syphilis due to a lack of well trained staff, poor quality of test kits or due to infrastructural break downs (McCullough, 2012). At present, risk factors in various donors groups are debated. There is a concern that the use of financial incentives may attract infected donors that hide their health status to get paid (Politis, 2000). Results from clinical studies show that blood components from private blood banks are vested with the highest risk of hepatitis B (Politis, 2000). Paid blood donors tend to come from lower socio-economic classes where the use of alcohol and drugs are more common.

2.5. Literature on Blood Donating Behavior

2.5.1. Effects from Demographic and Socio-demographic Factors

Research done for the last 20 years tries to explain individual donor behavior by demographic variables and motivations. Most of the blood donors comes from a small dedicated group that differs from the general population. Factors that are associated with a person giving blood are, marital status, gender, educational level, occupation, peer pressure, apathy, self-esteem, race, social pressure, altruism, voluntarism and community service (McCullough, 2012).

2.5.2. The Effect of Gender on Blood Donation Rates

More females than males are first time blood donors, but with subsequent donations the percentage shifts to a male preponderance of 60-80%. In average, males represent 52% of the blood donors and females 48% (McCullough, 2012). The gender disparity is not as wide as it used to be. Women donate less blood than men on medical grounds. In average females weight less than men and females risk anemia when being pregnant (Healy, 2000). Data from more than 100 countries find that 30% of the donors are women (WHO, 2011). For 25 countries, the donation rate by women is above 40%, while for 16 of the countries it is less than 10% (WHO, 2011).

In Spain the blood donation rate for females is 46%, in Portugal 43%, in Italy and Greece are 32% and 33%, respectively, in Belgium 45.4%. In Netherland, France Denmark, the rate is about 50% while for United Kingdom and Finland the rates are 53% and 55% respectively (Bani and Giussani, 2010). "It does not, however, seem that the difference is related to territory, since the percentages of female donors in other Mediterranean countries, such as Spain and Portugal, differ considerably from that in Italy" (Bani and Giussani, 2010 p, 279). In Norway, the blood donation rates are 53% for men and 47% for women (Misje et al., 2005).

2.5.3. The Effect of Education on Blood Donation Rates

Education seems to be a positive determinant for a broad range of prosocial behaviors like blood donation, organ donation and charities (Bekkers and Graaf, 2006). It is found that people with a higher education are more likely to show prosocial behaviors than those with a lower education (Bekkers and Graaf, 2006). Blood donors tend to have a higher education than the general population. Donors with a university level of education are the ones with the highest blood donation rate. A study carried out in Canada found that more than 60% of the blood donors had a post high-school level of education (McCullough, 2012).

2.5.4. The Effect of Age and Income on Blood Donation Rates

Figure 3 below describes how the blood donations vary across age groups and income groups for 77 countries. 5 % of the blood donors are below 18 years, 31% are between 18-24 years, 35% are between 24-44 years, 26% are between 45-65 years, while 3% are above 65 years (WHO, 2011). In high-income countries, 27% of the blood donors are under 25 years, whereas for low and middle-income countries the same age is 45%. High-income countries,

40% of the blood donors are older than 45 years, while for low-and middle-income countries of same age, the rate is only 18%. Many studies point to a strong association between income and blood donations rates (Todd and Lawson, 1999).

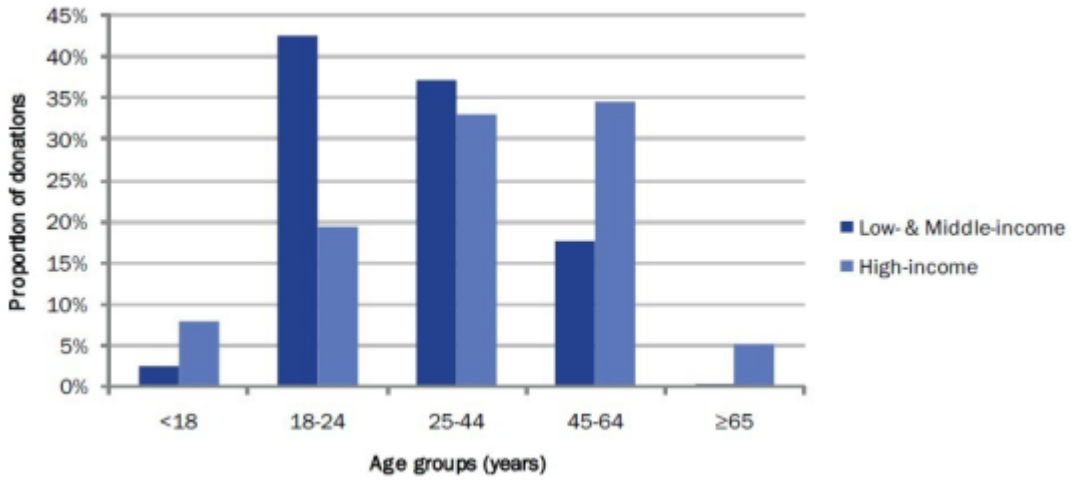

Figure 3: Blood donation from donors of various age group and country income group:

Source: (WHO, 2011).

The age-distribution of blood donors changed during the 1970s and the 1980s. 2-3% of the blood donors were above 60 years in 1970 while 10% were above the same age in 1990. This change in the age of the blood donors is attributed to the change that happened to the ages of populations in general (McCullough, 2012). Blood bank professional have also found that the blood of donors in older ages are safer than for younger groups and for this reason age limits have been waived to attract people of old ages (McCullough, 2012). For Norway, comparing the age distribution of blood donors with that of the general population, it is found that the youngest age group and the oldest age group (18-25 years and 56-65 years) are under-represented among blood donors (Misje et al., 2005)

2.6. The Organization of Blood Donations in Norway

Figure 4 describes how the Norwegian health care system is organized. Norway has a decentralized system with universal coverage. The core aim is to provide equal health services to all citizens, irrespective of geographical location, gender, age and income. The responsibility of providing primary health services is vested on 431municipalities (Morland et al., 2010). Since the hospital reform of 2002, the responsibility of specialist care has been assigned to four Regional Health Authorities (RHAs) (Morland et al., 2010).

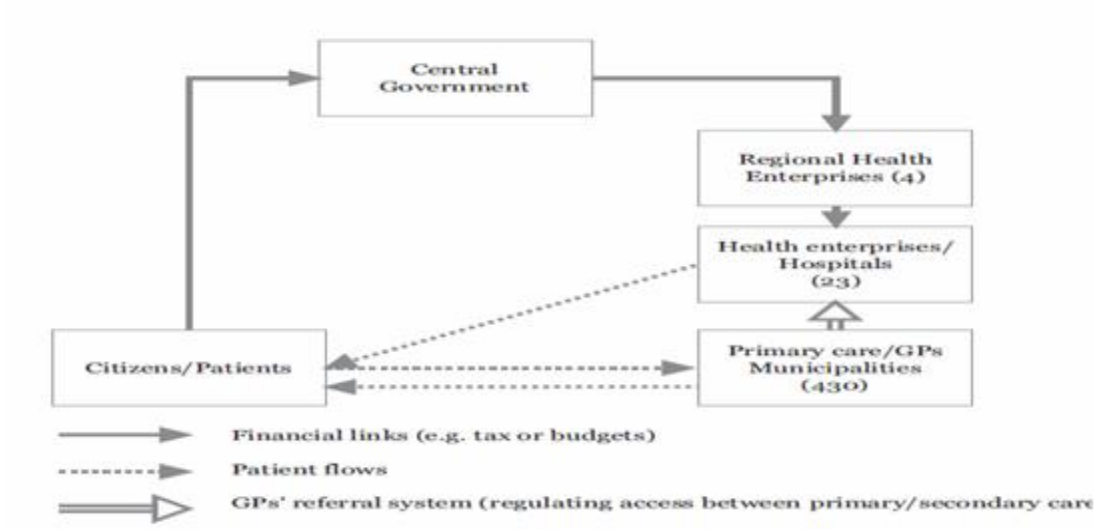

Figure 4: Structure and organization of Norwegian health care system:

Source: (Morland et al., 2010)

Each RHA run all the hospitals in each geographical region and are headed by an executive board being appointed by the Ministry of Health. The four RHAs owns all hospitals in their area and each hospital is a separate entity, in tandem to the restructuring, all directorates, institutes and registers in health service have been restructured (Flesland and Seghatchian, 2005). All blood collection pools in Norway are organized and administered within the hospitals. In total there is 58 blood collection centers that are organized together with the laboratories for clinical chemistry (Rock et al., 2000). The blood banks are individual departments in the hospitals. Blood donation in Norway is considered as being voluntary and based upon altruistic motives since there are no financial incentives for giving blood (Misje et al., 2005). However, the blood donors are given a small token of gratitude being an umbrella, a bag or a cap with the blood bank logo and some money to compensate the expensed incurred by travelling to the blood bank centers (Misje et al., 2005).

In 1949 the blood banks were operated by Rikshospitalet and Drammen Sykehus, and later the hospitals in Bergen, Trondheim and Stavanger were included, while the blood donors were recruited by the Norwegian Red Cross (Misje, 2001). In 1960, The Red Cross operated its own blood bank in Oslo, the Red Cross Blood Center. This blood bank sold blood and blood products to other hospitals around the country (Misje, 2001).

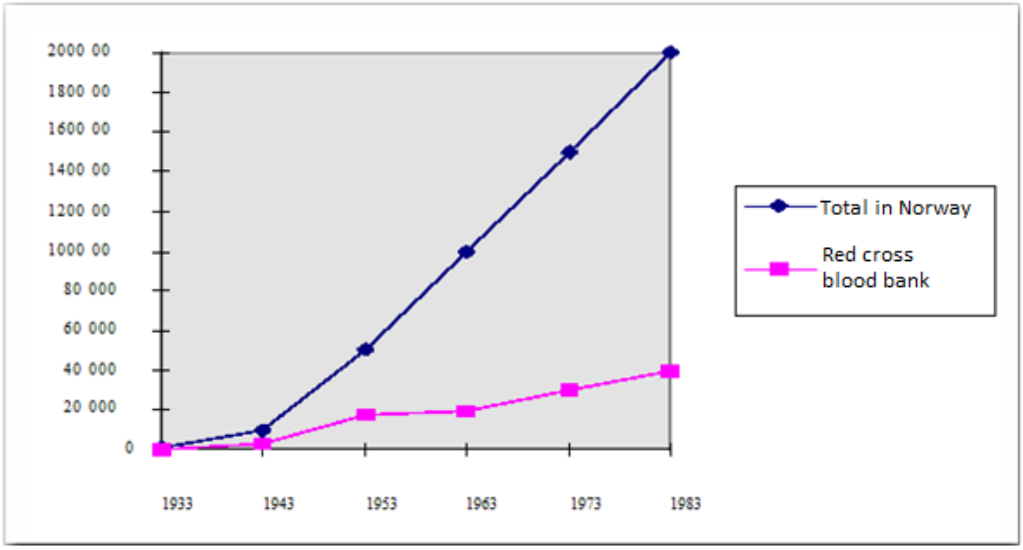

Figure 5: Blood donation in Norway 1933-1983: Estimate:

Source: (Rjaster and Kronstad 1981:48)

Figure 5 shows the development in the blood donation rates (growth) in Norway from 1933 to 1983. First, it is observed that the total growth has been explosive. Between between1943 and 1958, the blood donation have increased 20 times (Misje, 2001). Second, in the same period, the relative importance of the Red Cross has declined.

2.6.1. Laws and Regulations; Blood Donation in Norway

In January 2003, European Union approved new legislation by issuing stricter particular guidelines to all member states (Hervig et al., 2004). Norway is not part of the European Union, but is obliged to follow EU directives (Hervig et al., 2004). From 1990, Norway have implemented transfusion guidelines, being prepared by specialists and approved by the Surgeon General. The latest version was published in 1997 (Hervig et al., 2004).

2.6.2. Blood Donors in Norway

The recruitment of blood donors is challenging in Oslo while in rural areas it is satisfactory (Flesland et al., 2001). One interesting feature of the present Norwegian legislation is that blood donors are termed as “patients” ” (Flesland et al., 2001). “This is counterintuitive to most people working within the transfusion service and to the blood donors (Flesland and Seghatchian, 2005 p, 8). The Norwegian society used to be a very homogenous society, but in the last thirty years the influxes of foreigners from far countries have changed this (Hervig et al., 2004). In the 1997 guidelines for transfusion, people from other ethnical groups were not allowed to donate blood. This again created political outcry and there was a call for a more

liberal policy (Hervig et al., 2004).

In 2001 institute of Public Health established committee of experts to undertake policy changes towards the practices. The committee suggested the change of prevailing exclusion criteria for blood donors, implying that most foreigners and their sexual partners were now allowed to donate blood after a period of six months starting at the time they arrived Norway (Hervig et al., 2004).

2.6.3. Quality of the Blood

Various blood banks work relentlessly to prevent the transmission of infectious diseases through blood transfusions. Before blood donations are carried out, donors fill out self-administered questionnaires and are thereafter interviewed by health care personnel (Stigum et al., 2001) The questionnaires are issued by the Norwegian Board of Health(NBH) and are designed to assess the individual risk of infectious diseases (Stigum et al., 2001).The Good Manufacturing Practice (GMP) guidelines published in 1995 resulted in an improvement in the quality of the Norwegian transfusion services (Flesland and Seghatchian, 2005). Since then, accreditation bodies have accredited some blood banks according to specific standards. In addition, to reduce the risk, blood banks are inspected more regularly than any other department in a hospital. Currently, the transfusion medicine is regarded as safe, since the virus transmission has been adequately dealt with (Flesland and Seghatchian, 2006).

3.0. Theory on Incentives and Blood Donating Behavior

Various authors have discussed the role of incentives in connection with blood donation. In this section some of these literatures are to be commented upon.

The question of how to recruit more blood donors led economists to suggest the use of financial compensations. However, such an approach was challenged by Richard Titmus, in his influential work from 1970 called “The gift relationship”. In this work he established a dichotomy between the economic incentives for increasing blood donation rates and a solidarity system of altruistic unpaid donors” (Buyx, 2009 p, 329). Titmus argued that paying for blood donations would decrease, rather than increase the supply of blood. Over time the idea that such payments may be work negatively received more support among scholars – including some economists (Mellstrom and Johannesson, 2008). A possible outcome of the debate referred to above has been that most of the developed countries have abandoned systems with paid blood donations, and uses either fully altruistic donation systems or mixed

system with compensations only for incurred donor expenses (Buyx, 2009).

Many other researchers have discussed the idea put forward by Titmus. Frey and OberholzerGee (1997) argued that introducing payments might reduce ones' intrinsic motivation for behaving in an altruistic matter. In this way, the use of financial incentives could reduce blood donation rates among those already donating blood and demotivate those that planned to donate blood in future. Montonyo-Fernandez 1997 on the other hand, argued that a paid donation system is adequate since blood donation is a private good, and not a public good, and private goods can be supplied by markets in an effective way

Many economic models assume that people pursuit their own material self- interest (consumption) and give less concern to others (Fehr and Schmidt, 1999). However, income and consumption is only one of several motivations that may guide human behavior. The literature often distinguishes between intrinsic motivations and extrinsic motivations. Intrinsic motivations infer to incentives coming from within human being (inner feelings, moral obligation and self-realization), while extrinsic motivations originate from outside of the individual (e.g. recognition and money)(Grepperud and Pedesen, 2006).

Theories that challenge the economic paradigm have been tested the recent decades by using experimental data. An important conclusion from these studies is clearly that humans are not only driven by a pure self-interest (Frey and Meier, 2004). People are also motivated by factors such as honor, respect, friendship and other social and psychological factors (Olson, 1965). Becker (1974p, 1083), Observed, that 'apparent "charitable" behavior can also be motivated by a desire to shun ridiculing of others or to get social praise. Clearly pressure from community, feeling of guilt, compassions, or simply longing for a 'warm glow' may play vital roles in agents decision-making (Andreoni, 1990).

In relation to voluntary blood donation behavior other pro-social motives than altruism have also been discussed. In such models, in addition to own utility, they also consider the utility of other individuals as well. Bani and Strepparava (2011), Stated that blood donors sometimes show benevolence rather than altruism where benevolence is defined as a mixture of interest and altruism. Fairness motives in terms of inequality aversion may also influence behaviors (Frey and Meier, 2004). However, some evidence suggests that fairness considerations are rather unimportant. For example, " in competitive experimental markets with complete contracts, in which a well-defined homogeneous good is traded, almost all subjects behaved

as if they were only interested in material payoffs" (Fehr and Schmidt, 1999 p, 818). The other approach is the reciprocity relationship entailing good acts are paid with good and bad acts are paid with bad acts (Frey and Meier, 2004).

In the crowding theory literature, payments are believed to have two kinds of effects. The first effect, the direct economic effect, makes remunerated behaviors more attractive. The second effect, the indirect psychological effect, makes remunerated behavior less attractive. Thus, the psychological indirect effect works in opposition to the direct economic effect since the economic effect may crowd-out pro-social motives (Gneezy et al., 2011)."Providing financial rewards for under-taking an activity thus have an indirect negative consequence given that intrinsic motivation is considered to be beneficial. The indirect negative effect has been termed the "the hidden cost of reward" (Frey and Jegen, 2001 p, 589).

Figure 6 put forward by (Frey and Jegen, 2001), portrays the two effects graphically. S is the normal supply curve that is being based upon the direct economic effect, only. If a monetary reward for work effort is introduced (going from a reward equal to 0 to a reward equal to R), we observe that work effort now increases from A to A'. The presence of the indirect psychological effect implies simultaneously a shift in the supply curve from S to S' (the crowding-out effect). This again implies that work effort is being reduced from A' to A''. Thus introducing a reward implies that work effort is being reduced from A to A''. In the graph, we can say that the crowding effect dominates the economic effect.

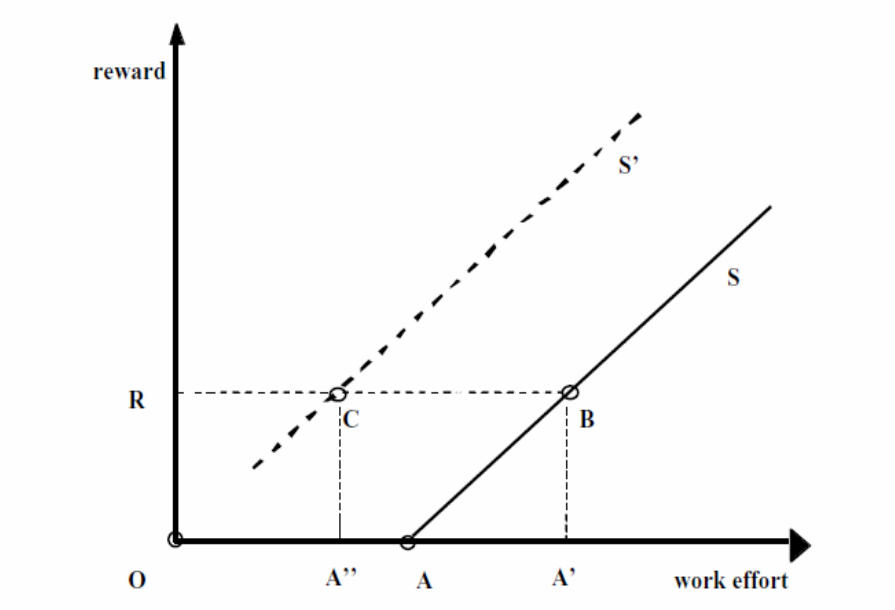

Figure 6: Illustration of the crowding-out effect

Source: (Frey and Jegen,)

The presence of crowding-effects in relation to blood donations has been tested by (Mellstrom and Johannesson, 2008). In one experiment, subjects were randomly grouped into three different groups. In the first group no incentives were given, in the second group individuals were offered SEK 50 to become blood donors, and in the third group the individuals could choose between receiving SEK 50 or donating SEK 50 to a particular charity organization (The Swedish Children's Cancer Foundation). The researchers found a decrease in the blood supply from 43% to 33% when payments were introduced – a finding being in line with the presence of a crowding effect. However, the opposite effect occurred when compared with the group that could give away the payment to charity. Now, blood donation rate increased from 33% to 44%. A substantial difference between male and female was also identified. For males, the differences across groups were insignificant, while for females the differences were significant.

In the forthcoming sections, the findings from analyzing data based upon a Norwegian survey will be presented. The respondents are asked whether they believe that higher payments for giving blood will lead to more people donating blood in Norway. Since the respondents are not blood donors, but is a sample of the Norwegian population, the answers to the above question may reveal if people in general believe in a dominating crowding-out effect or not. In addition, I will also investigate if the socio-demographic factors that in the literature is

proven to have an effect on actual blood donation behavior such as gender, age, education and income, also have an effect on the beliefs as to whether paying blood donors will increase the supply of blood donations in Norway or not.

4.0. Method and Data

4.1. Study Design

The data of the study comes from a survey where the respondents were asked about their beliefs about the effects from introducing payments for blood donation. The study was performed in February and March of 2007. A postal questionnaire was sent to 900 randomly selected adults over 17 to 80 years from the 20 counties of Norway. The questionnaire included demographic variables such as ages, income, level of education and gender. Thereafter, question on peoples beliefs about paying for blood was introduced in Norwegian and further translated to English; *Tror du at høyere betaling for å gi blod vil føre til at flere gir blod? Do you believe that higher payment for giving blood will lead to more people to donate blood?* The respondents were presented with the following three items when responding to the above question: Y*es*, N*o* and *I don't know*. In the process of collecting data, one reminder was sent to all selected respondents, 743 returned back the answered questionnaire making the response rate 83%.

4.2.Data collection and Limitation

The study sample has 743 respondents with few missing data in general. The variable income had some unanswered items, even though it is not quite big. In the process of running Chi-Square test and the regression analysis, income could not fulfill the required assumptions. For that reason I decided to merge some of the income groups (from 11 items to 4 items), so that assumptions are fulfilled. This creates some limitations due to having wide income groups rather than narrow income groups. Furthermore, in process of doing cross tabulation on the education levels such as (elementary, primary, secondary and university) with beliefs about paying for blood. Some cells were found to hold less than 5 units, which is not line with chi-square cross tabulation rules, we therefore, decided to collapse some items (elementary and primary) into one item called Lower level of education. More descriptions of the explanatory variables of this study is given in table 1.

4.3.Data Descriptions

The table below describes the explanatory variables of this study including the total number of respondents and the corresponding percentages.

Table 1: Describes variables in the study

Income in (1000000)	< NOK 0.299	135	18,2%
	NOK 0.3-0.599	302	36,0%
	NOK 0.6- 1.2	267	40,7%
	Unswered & I don't know (U&Ds)	38	5,1%
Level of education	Lower level	71	9,6%
	Secondary level	244	32,9%
	University level	427	57,5%
Age groups	Age group17-32	192	25,9%
	Age group 33-48	264	35,6%
	Age group 49-64	217	29,2%
	Age group 65-80	69	9,3%
Gender	Female	371	50,0%
	Male	371	50,0%
Valid		742	100,0%
Missing		1	
Total		743	

The respondents of with a reported income between NOK 0.6 TO NOK 1.2 represent 40.7% of the full sample, while the income group between NOK 0.3 to NOK 0.599 presents 36%. Those with income below NOK 0.299 have a share equal to 18,2%. Those that did not answer the income question or responded "I don't know, in the following called U&D, comprised only 5,1%. The percentage distribution of gender is 50% male and 50% female. The age group 33-48 has a percentage equal to 35,6%, followed by the age group 49-64 which is 29,2%. Age groups 17-32 and 64-80 years have percentages equal to 25,9% and 9,3% respectively.

4.4. Statistical Analysis

The raw data collected were coded and entered in the data entry sheet and analyzed by SPSS 19 software. Descriptive statistics was used in order to summarize the variables. Further, Multinomial Logistic regression analysis is used since our dependent variable (hereafter denoted as ("beliefs") has three nominal categorical outcomes *(1=Yes; 2=No, and, 3= "I don't know").* A Logistic regression was chosen since it is adequate for testing relationships between categorical dependent variables and independent variables. Specially, A Multinomial Logistic regression was chosen for two purposes. First, because a Multinomial Logistic regression model represents an effective and reliable way of obtaining an estimated probability of belonging to a specified population (e.g."beliefs") in terms of odd ratios (Ying Joanne Peng, 2003). Second, because a Multinomial Logistic regression model is a method that estimates net effects of a group of independent variable on the outcome variable (Ying Joanne Peng, 2003). A Multinomial Logistic regression uses maximum likelihood predictions to evaluate the probability of categorical memberships.

In analyzing the data of this study, we employed the following three methods to answer our two research questions:

(i) A Pearson Chi-Square test is applied to study whether "beliefs" differ in a significant way?

(ii) Cross tabulations using Pearson Chi-Square tests are used to test the possible effects from gender, income, education level and age on people's beliefs.

(iii) Univariate and Multivariate Multinomial Logistic regressions are applied to estimate odd ratios for three different models of the study; Model A *("Yes" versus "I don't know"), Model B (("No" versus "I don't know"),* and Model C *("Yes" versus "No").*

4.5. Multinomial Regression Model

A Multinomial Logistic regression model is a generalization of the standard Logistic model (binary response) that fits multiple category responses (Starkweather and Moske, 2011). At each combination of levels of the independent variables, the model assumes that the categories of the outcome variables have a Multinomial distribution. The Multinomial Logistic model can be applied to any number of categories, but more understandable results can be extracted from the model when the outcome variable has only three categories. Since the dependent variable in our study have three outcome (categorical variables) that cannot be

ranked in a meaningful way, a Multinomial regression model is appropriate. The response variable of the analysis is "beliefs" (Y), which can be presented as follows:

The r$esponse\ Variable\ (Y)$: $\begin{cases} 1 = Yes \\ 2 = no \\ 3 = \ I\ don't\ know \end{cases}$

Since the response variable may attain three categories we need two Logit models. There are k =4 explanatory variables (x_1, x_2, x_3,…x_k) in our model, being denoted as follows;

X_1 is "Gender"

X_2 is "Age"

X_3 is "Level of education"

X_4 is "Income (house3hold income)"

The Logit models for nominal responses pair each response category to a reference category where the choice of the reference category is arbitrary. For this study, the reference category chosen is the last category of the response variable being coded as 3 ("I don't know"). Given this assumption the three relevant models for this study are as follows:

Model A. "Yes" versus "I don't know"

$$ln\left[\frac{P(yes|x_1,\dots.,x_4)}{P(dontknow|x_1,\dots,x_4)}\right] = B_{10} + B_{11}x_1 + B_{12}x_2 + B_{13}x_3 + B_{14}x_4$$

Model B. "No" versus "I don't know"

$$ln\left[\frac{P(No|x_1,\dots.,x_4)}{P(dontknow|x_1,\dots,x_4)}\right] = B_{20} + B_{21}x_1 + B_{22}x_2 + B_{23}x_3 + B_{24}x_4$$

Model C. "Yes" versus "No"

$$ln\left[\frac{P(yes|x_1,\dots.,x_4)}{P(No|x_1,\dots,x_4)}\right] = ln\left[\frac{P(yes|x_1,\dots.,x_4)/P(dontknow|x_1,\dots.,x_4)}{P(No|x_1,\dots.,x_4)/P(dontknow|x_1,\dots.,x_4)}\right]$$

$$= ln\left[\frac{P(yes|x_1,\dots.,x_4)}{P(dontknow|x_1,\dots,x_4)}\right] - ln\left[\frac{P(No|x_1,\dots.,x_4)}{P(dontknow|x_1,\dots,x_4)}\right]$$

4.6. Statistical Assumptions and Dealing with Outliers

Multinomial Logistic regression analysis does not assume normality, linearity, or homoscedasticity, but assumes independence among the dependent categorical variables (Starkweather and Moske, 2011). This means that the choice of one category is not influenced by the choice of the other category. Cases of multicolinearity and outliers have to be checked because they may bias the findings. After checking for multicolinearity in the independent variables, the variance inflation factor (VIF) was found to be equal to one for all independent variables, suggesting no multicolinearity between the independent variables. Interaction was checked with SPSS for the selected explanatory variables (gender, income and age), and no changes in significances were found in single variable and the products of interacting variables.

SPSS does not compute any diagnostic tests for outliers in a Multinomial Logistic regression analysis (Homser, 2000). For this reason Logistic regression procedures are used to calculate diagnostic measures. In order to do so, the group that responded, *"Yes"* is compared with the group that responded, "*I don't know"*. Furthermore, the group that responded "No" is compared with the group that responded, "I don't know". Afterwards two binary logistic regressions was run using case selection to compare group 1 (Yes) and 2 (No) with group 3 (I don-t know)). From the two analyses, we will look for studentized residuals larger than ± 2.0%, and start testing multinomial solution without these cases. If the accuracy rate of this model is less than 2% more accurate, the model that includes all cases can be used.

Below the relationships between the independent variables (Age, Income, Education level and Gender) and the dependent variable (beliefs) are examined.

Table 2: Classification of accuracy with outliers

Observed	Predicted			
	Yes	No	I don't know	Percent Correct Predictions (PCP)
Yes	244	135	0	64,4%
No	131	172	0	56,8%
I don't know	34	27	0	0,0%
Overall Percentages	55,0%	45,0%	0,0%	56,0%

It follows from table 2, when all the cases that are regarded as outliers are included the overall accuracy rate (PCP) equals 56%. In table 3, the same results are presented, for the case where outliers are disregarded.

Table 3: classification of accuracy without outliers

Observed	Predicted			
	Yes	No	Idon't know	Percent Correct Predictions (PCP)
Yes	244	135	0	64,4%
No	131	172	0	56,8%
I don't know	33	15	0	0,0%
Overall Percentage	55,9%	44,1%	0,0%	57,0%

From table 3, we observe that after removing the outliers (12 outliers for " I don't know" in table 3?), the overall accuracy rate (PCP) has improved from 56% (*table 2)* to 57% (*table 3*). The overall accuracy has improved with 1%, which is less than 2%, thus the model that includes all outliers will be used in analyzing our data.

5.0. Results

In this chapter the results from three different types of analyses are to be presented. Section 5.1. Presents the results from the Chi-Square tests, section 5.2 present the results from the univariate regression models, while section 5.3 presents the results from the multivariate regression analyses. However, before doing this I will present the results for the responses of the "beliefs"- question presented in section 4.1 (page 15).

Of the 742 respondents, 378 (50.9%) responded, "Yes", 309 responded "No" (40.8%), and 61 (8.2%) responded, "I don't know". Of those that that had made up their opinion (683), 55.6 % answered "Yes" while 44,4% responded "No"(see table 4), meaning that the two groups do vary in size but not much. In order to find out whether there is a significant difference between the two groups that had made up their mind, a Pearson Chi-Square test was performed for the case where "I don't know" respondents were excluded, however, it is included for the subsequent regression analysis). The results from the Pearson Chi-Square test are presented in table 4 and we observe that the Chi-Square Statistics is 8,469[a] with a p-value equal to 004. Thus, there is a significant difference between those that had made up their opinion. More people believe that a higher payment for giving blood will lead to more people to donate blood than the opposite belief.

Table 4: The distribution across "Yes" and "No" for the "belief" variable (frequencies and percentages). Chi-Square test statistics

Yes	379 (55,6%)
No	303 (44,4%)
Chi-Square	8,469[a]
Df	1
Asymp. Sig.	,004

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 341,0.

5.1. The Role of the Socio-demographic Variables

In the following tables the distribution of responses ("beliefs") in relation to the each of the four following socio-demographic variables will be studied: Gender, Income, Age and Education will be studied using cross tabulations and Pearson Chi-Square test for all the variables.

5.1.1. Beliefs and Gender

Table 5 below shows how beliefs are distributed conditional on gender. We observe from this table that out of 743 respondents, 372 are females and 371 are males. Furthermore, we observe that the percentages across gender do not vary much for the three categories. The Pearson Chi-Square test gives a test statistics equal 0,675 (2 degrees of freedom) and a P-value equal to 0,714. These findings confirm that gender is not, in a significant way, associated with "beliefs".

Table 5: The distribution of responses (beliefs and gender). Frequencies, percentages and Pearson Chi-Square Statistics.

BELIEFS	Gender		Total
	Female	Male	
Yes	186	193	379
	50,0%	52,0%	51,0%
No	157	146	303
	42,2%	39,4%	40,8%
I don't know	29	32	61
	7,8%	8,6%	8,2%
Total	372	371	743
	100,0%	100,0%	100,0%

	Value	Df	Asymp. Sig. (2-sided)	P-value
Pearson Chi-Square	,675[a]	2		,714

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 30,46.

5.1.2. Beliefs and Age Groups

Table 6 below shows how the "beliefs" are distributed conditional on age groups. We observe from this table that out of 743 respondents, 192 belong to age group 17-32, 265 belong to age group 33-48, and 217 belong to age group 49-64 while 69 belong to age group 65-80. Furthermore, we observe that the percentages across age groups vary much for the three categories. Age group 17-32 has highest percentage responding "Yes" followed by age group 33-48. However, age group 17-32 has the lowest percentage response in terms of "No" whereas age group 49-64 has the highest percentage responding "No". The Pearson Chi-Square test gives a test statistics equal 61,690 (6 degrees of freedom) and a P-value equal to 0,000. These findings confirm that age is in a significant way is associated with "beliefs".

Table 6: The distribution of responses (beliefs and age). Frequencies, percentages and Pearson Chi-Square Statistics.

BELIEFS	Age groups in years (yrs.)				Total
	17-32 yrs	33-48 yrs	49-64 yrs	65-80 yrs	
Yes	137	128	85	29	379
	71,4%	48,3%	39,2%	42,0%	51,0%
No	46	114	117	26	303
	24,0%	43,0%	53,9%	37,7%	40,8%
I dont know	9	23	15	14	61
	4,7%	8,7%	6,9%	20,3%	8,2%
Total	192	265	217	69	743
	100,0%	100,0%	100,0%	100,0%	100,0%

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	61,690	6	,000

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,66.

5.1.3. Beliefs and Income

Table7 below shows how beliefs are distributed conditional on income. We observe from this table that, of 743 respondents, 268 belong to income group NOK 0.6 to NOK 1.2, 302 belong to income group NOK 0.3 to NOK 0.599, 135 belong to income group <NOK 0.299 while 38 belong to U&Ds. Furthermore, we observe that the percentages across income groups vary much across the three categories. Respondents with income less than NOK 299000 have the highest percentage that responded, "Yes". There are no much variations in response category for income NOK 0.6 to NOK 1.2and NOK 0.3 to NOK 0.599. The Pearson Chi-Square test gives a test statistics equal 16,004 (6 degrees of freedom) and a P-value equal to 0,014. These findings confirm that income is, in a significant way, associated with "beliefs".

Table 7: The distribution of responses (beliefs and income). Frequencies, percentages and Pearson Chi-Square Statistics.

BELIEFS	Income in Norwegian Kroner (NOK 1000000)				Total
	U&Ds	0.6-1.2	0.3-0.599	<0.299	
Yes	25	128	144	82	379
	65,8%	47,8%	47,7%	60,7%	51,0%
No	11	124	127	41	303
	28,9%	46,3%	42,1%	30,4%	40,8%
I dont know	2	16	31	12	61
	5,3%	6,0%	10,3%	8,9%	8,2%
Total	38	268	302	135	743
	100,0%	100,0%	100,0%	100,0%	100,0%

	Value	Df	Asymp. Sig. (2-sided)
Chi-Square Test	16,004	6	,014

5.1.4. Beliefs and Education Level

Table 8 below shows how beliefs are distributed conditional on Level of education. We observe from this table that, of 742 respondents, 71 have a Lower level of education, 244 have a Middle level education while 427 have a higher level of education. Furthermore, we observe that the percentages across Level of education do not vary much for the three categories. The Pearson Chi-Square test gives a test statistics equal 2,538 (5 degrees of freedom) and a P-value equal to 0,638. These findings confirm that education is not, in a significant way, associated with "beliefs".

Table 8: The distribution of responses (beliefs and education level). Frequencies, percentages and Pearson Chi-Square Statistics.

BELIEFS	Level of education			Total
	Lower level of education	Middle level of education	Higher level of education	
Yes	32	133	213	378
	45,1%	54,5%	49,9%	50,0%
No	33	93	177	303
	46,5%	38,1%	41,5%	40,8%
I don't do know	6	18	37	61
	8,5%	7,4%	8,7%	8,2%
Total	71	244	427	742
	100,0%	100,0%	100,0%	100,0%

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2,538[a]	4	, 638

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,84.

5.2. Univariate Analysis

Univariate Multinomial Logistic regression analysis was used to analyze the effects of univariate variables such as gender; income, age and education on the "beliefs" about paying for blood will lead to more people to donate blood. The results of the regression are shown in tables 9 to 12.

5.2.1. Univariate effect of Gender

The results from estimating the three models (A, B and C) are presented in table 9. In all models, the coefficients (B) and the odds-ratio are estimated. The reference category for the explanatory variable (gender) is male in all three models. We observe that the coefficient for gender is negative and insignificant for Model A and B and the odds-ratios are 0,94 (model A) and 0,843 (model B). For Model C, however, the same coefficient is positive (0,110), but still insignificant. The odds-ratio for Model C is 1,116 saying that females are 1.116 times more likely to say, "Yes" than "No".

Table 9: Univariate analysis of beliefs yes, no and I don't know with gender

Beliefs		B	P value	Odd ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Model A	Intercept	1,858	,000			
	Gender	-,061	,824	,940	,547	1,616
Model B	Intercept	1,689	,000			
	Gender	-,171	,543	,843	,486	1,462
Model C	Intercept	, 170	, 118			
	Gender	,110	,477	1,116	,825	1,510

a. Model A & B the reference category is. I don't know; Model C the reference category is. No; b. Male as a reference

5.2.2. Univariate Effect of Income

The results from estimating the three models (A, B and C) are presented in table 10. In all models, the coefficients (B) and the odds-ratio are estimated. The reference category for the explanatory variable (income) is <NOK 0.299 in all three models. We observe that the coefficients for all income groups in model A are positive except for income group NOK 0.3 to NOK 0.599), and are all insignificant. The odds-ratio for model A indicate that U&Ds and those with income between NOK 0.6 to NOK1.2 are 1,829 and 1,171 more likely to say "yes" than I don't know, whereas those with income NOK 0.3 to NOK 0.599 are 0,680 less likely to say "yes" than i don't know.

For Model B, all the coefficients (B) are positive, the odds-ratio for those respondents who unanswered and don't know (U&Ds) their income are 1,610 more likely to say "No" than "I don't know". In the same model, those with income between NOK 0.6 to NOK 1.2 are 2,268 times more likely to say "No" than "I don't know" and this coefficient is almost significant at a 5%-level (p- value 0,052), whereas those with income NOK 0.3 to NOK 0,599 are 1,199 more likely to say "No" as opposed to "I don't know".

For model C, only of the coefficients (B) of income U&Ds is positive but it is insignificant. However, for the income groups NOK 0.6 to NOK 1.2 and NOK 0.3 to NOK 0,599 the coefficients (B) are negative and are significant. The odd ratios of the respondents with income NOK 0.6 to NOK 1.2 and NOK 0.3 to NOK 0.599 indicates that the respondents are 0,516 and 0,567 less likely to respond "Yes" than "No".

Table 10: Univariate analysis of beliefs Yes, no and I don't know with income (NOK Million)

Beliefs	Income	B	P-value.	Odd ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
	Intercept	1,922	,000			
	U&Ds	,604	,449	1,829	,383	8,727
Model A	0.6 to 1,2	,158	,699	1,171	,527	2,601
	0.3-0.599	-,386	,293	,680	,331	1,396
	< 0.299	0[b]		1,0		
	Intercept	1,229	,000			
	U&Ds	,476	,569	1,610	,313	8,284
Model B	0.6 to 1.2	,819	,052	2,268	,991	5,189
	0.3-0.599	,182	,637	1,199	,564	2,548
	< 0.299	0[b]		1,0		
	Intercept	,693	,000			
	U&Ds	,128	,755	1,136	,510	2,534
Model C	0.6 to 1.2	-,661	,004	,516	,329	,809
	0.3-0.599	-,568	,012	,567	,364	,884
	< 0.299	0[b]		1,0		

a. Model A & B the reference category is. I don't know; Model C the reference category is. No; b. reference income <0.299

5.2.3. Univariate effect of Age Groups

The estimated results for three models (A, B and C) are presented in table11. In all models, the coefficients (B) and odds-ratios are estimated. The reference category for the explanatory variable (age) is age group 65-80 years in all three models. We observe that the coefficients for all age groups are positive except for one group in model C. Furthermore, all age groups in model A and B are significant while only one age group in Model C is significant.

The odd ratio for age group 17-32 years in Model A is 7,349, saying that this age group are 7,349 times more likely to say "Yes than "I don't know". In the same model the odd ratio for age groups 33-48 and 49-64 are 2,687 and 2,736, saying that these two age groups are 2,687 and 2,736 times more likely to say "Yes" as opposed to "I don't know".

For model B, the odd ratio for age groups 17-32 years and 33-48 are 2,752 and 2,669, saying that these age groups are 2,752 and 2,669 more likely to say "Yes" as opposed to " I don't know". However, the odd ratio for age group 49-64 is 4,2, saying that this age group is 4,2 more likely to say "Yes" than "I don't know".

For model C, the odd ratios of age groups 17-32 and 33-48 are 2,670 and 1,007, this is to say that these groups are 2,670 and 1,007 more likely to say "Yes" than "No". However, the odd ratio of age group 49-64 are 0,651, and for that regards they are less likely to say "Yes" as opposed to "No"

Table 11: Univariate analysis of beliefs yes, no and I don't know with age groups

Beliefs	Age	B	P-value	Odd ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Model A	Intercept	,728	,025			
	17-32	1,995	,000	7,349	2,904	18,593
	33-48	,988	,013	2,687	1,235	5,844
	49-64	1,006	,019	2,736	1,179	6,346
	65-80	0[b]		1,0		
Model B	Intercept	,619	,062			
	17-32	1,012	,040	2,752	1,048	7,228
	33-48	,982	,015	2,669	1,212	5,876
	49-64	1,435	,001	4,200	1,807	9,760
	65-80	0[b]		1,0		
Model C	Intercept	,109	,686			
	17-32	,982	,002	2,670	1,428	4,993
	33-48	,007	,982	1,007	,560	1,810
	49-64	-,429	,160	,651	,358	1,185
	65-80	0[b]		1,0		

a. Model A & B the reference category is. I don't know; Model C the reference category is no

b. The reference age 65-80

5.2.4. Univariate effect of Education Levels

The results from estimating the three models (A, B and C) are presented in table12. In all models, the coefficients (B) and the odds-ratio are estimated. The reference category for the explanatory variable (education) is higher level of education in all three models. We observe that the coefficients (B) are negative for Lower level of education for both model A and C, but positive for model B. The coefficients (B) for Middle level of education are all positive.

Table 12: Univariate analysis of beliefs yes, no and I don't know education level

Beliefs	Education Level	B	P-value	Odd ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Model A	Intercept	1,750	,000			
	Lower level	-,076	,873	,926	,362	2,370
	Middle level	,250	,418	1,24	,702	2,347
	Higher level	0[b]	.	.	.	.
	Intercept	1,565	,000			
Model B	Lower level	,140	,771	1,10	,449	2,941
	Middle level	,077	,807	1,00	,583	2,001
	Higher level	0[b]	.	.	.	.
Model C	Intercept	,185	,069			
	Lower	-,216	,421	,806	,476	1,363
	Middle	,173	,308	1,188	,853	1,656
	Higher	0[b]	.	.	.	.
	Higher	0[b]	.	.	.	.

a. Model A & B the reference category is. I don't know; Model C the reference category is no

b. The reference Higher education level

5.3. Multivariate Analysis

In this section we present the results from undertaking Multivariate Multinomial Logistic regression analyses meaning that all four explanatory variables now enter simultaneously into each regression. Table 13, below, sums up the most important findings from the three models (Model A, B and C). Each of the three models will be commented upon in more detail below. In doing this, I will only focus on variables that are found to be significant. For the explanatory variables the chosen reference categories are male (Gender), 65-80 yrs. (Age groups), less than NOK 299000 (Income) and High (Education level).

Model A compares respondents answering, "Yes" with those that responded, "I don't know". We observe from table 13 that the only explanatory variable that is significant is Age. All three age groups are now significant at a 5%-level. Compared with age group 65-80 yrs., the age group 17-32 is 6,842 times more likely to answer, "Yes" than to answer "I don't know". The age groups 33-48 yrs and 49-64 yrs are 2,35 and 2,37 times more likely to respond "Yes" as opposed to "I don't know" relative to age group 65-80 yrs.

Model B compares respondents answering "No" with those that responded, "I don't know". We now observe that Age is the only explanatory variable that is significant and all three age groups are still significant at a 5%-level. Compared with age group 65-80 yrs., the age group 17-32 yrs. is 2,687 times more likely to answer "No" than to answer "I don't know". The age groups 33-48 yrs and 49-64 yrs. are 2,28 and 3.58 times more likely to respond "No" as opposed to "I don't know" relative to age group 65-80 yrs.

Model C compares respondents answering "Yes" with those answering "No". Now we observe that one of the age groups (17-32 yrs) as well as gender become significant. Members of the age group 17-32 yrs are 2,54 times more likely to say "Yes" as opposed to "No" if compared with the reference age group. Furthermore, females are 0,72 times less likely to say, "Yes" than "No" if compared with males.

Table 13: Multinomial logistic regression analysis (Model A, B and C). Odds-ratio and P-values.

Characteristics of the variables	Model (A) Yes Versus I don't know		Model (B) No versus I don't know		Model(C) Yes Versus no	
	Odd ratio	P-value	Odd ratio	P-value	Odd ratio	P-value
Gender						
Female	0,921	,775	1,278	,401	0,720	,046
Male	1,0	.	1,0	.	1,0	.
Income (NOK)						
U&Ds	1,479	,630	1,318	,744	1,122	,788
0.6-1.2	1,491	,364	2,228	,077	0,669	,108
0.3-0.599	0,883	,748	1,293	,522	0,683	,112
<0.299	1,0	.	1,0	.	1,0	.
Age groups						
17-32 yrs	6,842	,000	2,687	,050	2,546	,004
33-48 yrs	2,35	,035	2,288	,045	1,027	,930
49-64 yrs	2,37	,049	3,584	,004	0,661	,184
65-80 yrs	1,0	.	1,0	.	1,0	.
Education levels						
Lower	1,234	,673	1,387	,512	0,189	,681
Middle	1,311	,395	1,119	,576	1,094	,615
Higher	1,0	.	1,0	.	1,0	.

6.0. Discussion

To ensure an adequate supply of blood, the use of economic incentives have been proposed (Kasraian and Maghsudlu, 2012). However, economic incentives need not be effective in achieving adequate supply of blood as often stated in the literature (Chmielewski et al., 2012). Given this, it is interesting to know what people in general believe about the effects from improved economic incentives and what factors that affect such beliefs.

In this paper, studying the general "beliefs" of the Norwegian population, we found that there is a significant difference between the number who believe that paying for blood will lead more people to donate blood than the number that believe the opposite. This finding may suggest that a majority of Norwegians do not believe that the crowding-out effects dominated the price effect when it comes to blood donation. However, the findings from this study do not say that if higher payments for blood donation is introduced, that the number of donors will increase. The reason for this is that the respondents do not say whether or not themselves will donate more blood in response to improved economic incentives.

In analyzing the factors that affect people's "beliefs" about blood donation behavior, we found that gender is insignificant both for the Pearson Chi Square test and the Univariate Multinomial Logistic regression model, but it became significant for the Multivariate Multinomial Logistic regression model. Income is significant for the Pearson Chi Square test, but show slight significance NOK 0.6 to NOK 1.2 in model B and significance in both income NOK 0.3 to NOK 0.599 and NOK 0.6 to NOK 1.2 in model C for the Univariate, But insignificant for Multivariate Multinomial Logistic regressions. Age became significant for all three methodologies with the exception of age groups *33-48* and *49-64* Years in model C, Education is insignificant for all three models.

Table 14: Significant Factors at 5%-level. Beliefs about paying for blood donations

Variable characteristics	Pearson chi square	Univariate Multinomial Logistic regression	Multivariate Multinomial Logistic regression
Gender	-	-	Significant (model C)
Income	Significant	Significant for model C	-
Age groups	Significant	Significant for model A and B. Model C for one age group	Significant for model A and B. Model C for one age group (17 - 32 years)
Education level	-	-	-

All income categories are found insignificant except income NOK 0.3 to NOK 0.599 and NOK 0.6 to NOK 1.2 in Model C in *table 10a*. From this study we found that people with high income will not donate blood in exchange of payment. This is in line with earlier studies that introducing income reward in blood donation, crowding out effects (figure 6) occurs (Frey and Jorgen, 2001.

Examining gender differences in the motivation individuals so that more volunteers for blood donation, we found that women are less motivated by payment than men. However, we are cautious about this finding, because female has been insignificant in univariate and suddenly it changed to be significant in Multivariate. The cause of this change can be due to unbalanced sample size and extremely group variation, relative to between group variations, that have been put forward by (Yi Xue Za Zhi, 1995) which I found in the sample study. However, a study done Chmielewski et al. (2012) found that payment crowded-out intrinsic motivations of females and hence few volunteered for paid blood donation.

Age groups are found to play a significant role in an effort to increase blood donation. From this study we found that people of younger ages beliefs paying for blood increases the recruitment of blood donors. Moreover in a comparative study between unpaid and paid blood donation found out that paid blood donor are significantly males of younger age (Condie and Maxwell, 1970). The respondents of age group 17-32 beliefs payment increases blood donation and for that regards their intrinsic motivations are replaced by extrinsic motivations such as payment.

In respect to respondents level of education we found that no significant multivariate difference between the low levels of education and middle level of education. However, most respondents with lower level of education share the beliefs that payments will not lead to more blood donors, but in a study done Chmielewski et al. (2012) found those with low level of education were found to be interested in receiving incentives.

The study is a representative of the Norwegian population with high response rate. But, it has to be interpreted with reservation due to some limitations found. From the results we found some differences of chi-square analysis, univariate and multivariate Multinomial Logistic regression. For instance variable gender that are found insignificant in the cross tabulation frequency and in univariate are found to be significant multivariate multinomial logistic regression. Also in the process of dealing with interactions some of the categories of independent variables are combined. This makes the width intervals of categories large; hence information that could be available in smaller intervals may not be available in larger width intervals. The confidence intervals (CI) of some variables are found to be wide, which can be a weakness that can bias the findings of the study. Finally, one of the response outcome variable has too few respondents as compared to other two outcome variables. For that regards comparing it to others that have high respondent may result findings that are questionable.

7.0. Conclusion

Earlier studies have hypothesized that paying blood donors might undermine people's intrinsic motivations and in this way discourages people from donating blood . One example is Richard Timus (1970) who put forward the hypothesis that blood donation will be reduced when payment is introduced. In this paper we studied peoples beliefs about the effects from using economic incentives in connection with blood donation.

The two main findings from this study are: (i) that the majority of the Norwegian population above 17 years believe that payments will lead more people to donate blood. However, the difference between those that believe and those that do not believe is not very large (55% and 45% of those that have made up their mind), (ii), that Norwegians younger than 50 years, more than older people, believe that economic incentives will increase the number of blood donors. In addition, there is some evidence that females, to a lesser extent than males, believe in such an effect.

The scope of this research is confined to general beliefs yes, no and I don't know for paying blood and in addition word "payment" which was used has been too general. Future research that uses both qualitative and quantitative data with broader perspectives on beliefs and specified incentives is recommended.

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9.0. Appendix

15a: Table showing multivariate multinomial Logistic regression analysis with three outcome variables and independent variables.(tables 15a and 15b are combined in to one as shown in table 13 in page 32)

Do you belief higher payment for blood donation wil cause many people to donate?[a]		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	,676	,172			
	No answer & dont know (U&Ds)	,391	,630	1,479	,301	7,264
	0.6-1.2	,399	,364	1,491	,629	3,533
	0.3-0.599	-,125	,748	,883	,413	1,888
	<0. 299	0[b]	.	.	.	.
	Lower level	,210	,673	1,234	,465	3,277
	Middle level	,271	,395	1,311	,702	2,450
	Higher level	0[b]	.	.	.	.
	Age group17-32 yrs	1,923	,000	6,842	2,642	17,721
	Age group 33-48 yrs	,854	,035	2,350	1,060	5,208
	Age group 49-64 yrs	,863	,049	2,371	1,004	5,598
	Age group 65-80 yrs	0[b]	.	.	.	.
	Female	-,083	,775	,921	,523	1,623
	Male	0[b]	.	.	.	.
no	Intercept	,124	,809			
	No answer & dont know (U&Ds)	,276	,744	1,318	,252	6,909
	0.6-1.2	,801	,077	2,228	,918	5,407
	0.3-0.599	,257	,522	1,293	,588	2,844
	<0. 299	0[b]	.	.	.	.
	Lower level	,327	,512	1,387	,522	3,680
	Middle level	,181	,576	1,199	,635	2,264
	Higher level	0[b]	.	.	.	.
	Age group17-32 yrs	,988	,050	2,687	,998	7,232
	Age group 33-48 yrs	,827	,045	2,288	1,018	5,139
	Age group 49-64 yrs	1,277	,004	3,584	1,515	8,480
	Age group 65-80 yrs	0[b]	.	.	.	.
	Female	,245	,401	1,278	,721	2,267
	Male	0[b]	.	.	.	.

a. The reference category is: I don't know.

b. This parameter is set to zero because it is redundant.

Parameter Estimates

15b: Table showing multivariate multinomial Logistic regression analysis with three outcome variables.

Do you belief higher payment for blood donation will cause many people to donate?		B	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
yes	Intercept	,552	,118			
	No answer & don't know(U&Ds)	,115	,788	1,122	,485	2,597
	0.6-1.2million	-,402	,108	,669	,410	1,093
	0.3-0.599	-,382	,112	,683	,426	1,094
	< 0.299	0[b]	.	.	.	.
	Lower level	-,117	,681	,890	,511	1,551
	Middle level	,090	,615	1,094	,771	1,551
	Higher level	0[b]	.	.	.	.
	Age group17-32 yrs	,935	,004	2,546	1,344	4,823
	Age group 33-48 yrs	,027	,930	1,027	,564	1,869
	Age group 49-64 yrs	-,413	,184	,661	,359	1,218
	Age group 65-80 yrs	0[b]	.	.	.	.
	Female	-,328	,046	,720	,522	,995
	Male	0[b]	.	.	.	.
i dont know	Intercept	-,124	,809			
	No answer & don't know (U&Ds)	-,276	,744	,759	,145	3,975
	0.6-1.2	-,801	,077	,449	,185	1,089
	0.3-0.599	-,257	,522	,773	,352	1,700
	<0. 299	0[b]	.	.	.	.
	Lower level	-,327	,512	,721	,272	1,914
	Middle level	-,181	,576	,834	,442	1,575
	Higher level	0[b]	.	.	.	.
	Age group17-32 yrs	-,988	,050	,372	,138	1,002
	Age group 33-48 yrs	-,827	,045	,437	,195	,982
	Age group 49-64 yrs	-1,277	,004	,279	,118	,660
	Age group 65-80 yrs	0[b]	.	.	.	.
	Female	-,245	,401	,782	,441	1,388
	Male	0[b]	.	.	.	.

a. The reference category is: no.

b. This parameter is set to zero because it is redundant.