

TALLINN UNIVERSITY OF TECHNOLOGY

School of Information Technologies

Department of Health Technologies

**MAJOR HEALTH CHALLENGES OF ESTONIAN  
STUDENTS  
AND TELEMEDICINE**

Master Thesis

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**EESTI ÜLIÕPILASTE PEAMISED  
TERVISEPROBLEEMID JA TELEMEDITSIIN**

Magistritöö

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Juhendaja: Peeter Ross, MD, PhD

TALLINN 2018

## **Author's declaration of originality**

I hereby certify that I am the sole author of this thesis and the materials used in this thesis are being cited. This thesis has not been submitted before for defense or any examination anywhere.

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Suruchi Aanand Mehta

18.01.2018

# **Abstract**

## **Objective**

Throughout the decade several articles have been published about the importance of telemedicine in promoting the health care for people living in remote areas and for old age population. However, in this study, the university students are taken into considerations that are experiencing the various health challenges. The main aim of this study is to find out, to what extent the three main sources such as stress, alcohol and drugs are going to affect the student life and how telemedicine is helpful in resolving these issues.

## **Method**

In this thesis, the author has used two research methods such as literature analysis of main health problems of students and questionnaire survey. Both methods are used to figure out the healthcare challenges that are being faced by students.

The survey questionnaires were distributed among students of various universities in Estonia (which include Tallinn University of Technology, Tallinn University and Euro Akadeemia). These questionnaires were used to access the healthcare challenges and to evaluate the need for telemedicine among students.

## **Results**

Majority of the students believe that mental health, alcohol consumption and drug intake problems can be minimized by using telemedicine services with 67%, 66% and 54% respectively. However, 99% of the students take alcohol on special occasion whereas; only 1% of students did not consume alcohol. In binge drinking, 34% of the students are engaged. Majority of the students sometimes experience sign and symptoms of depression with 49%. Whereas, very less number of the students never experience the sign and symptoms of depression. Almost 96% of students are not addicted to drugs. The maximum number of students thinks that they will get more time for consultation with a doctor and ask their entire query freely through telemedicine as compared to the hospitals or in primary care centers.

About, 73% of the students are agreed that frequent counselling and interaction with the doctor through telemedicine services will help in maintaining their good health. Almost, all the students (97%) want to connect with health care services when they are travelling or moving to some other countries.

## **Conclusion**

In this study, it is found that most of the students are interested to know more about telemedicine if the university will provide information to them. They also show positive response to know about telemedicine because only 1% of students are using telemedicine at present. Also, a greater number of the students believe that mental health problems, alcohol and drug intake problems can be reduced by using telemedicine.

As far as health conditions of the students are concerned, large number of the students are the consumers of alcohol out of which some are engaged in binge drinking. Majority of the students use alcohol or drugs in order to make them feel better. In addition to this, most of the students are found to be suffering from depression.

This study also projects that not only health of students but on the other hand it's the requirement of the country to make their younger population healthy. It is the need of the country to implement telemedicine in order to minimize the cost incurred in providing health care services.

The thesis is in English and contains 50 pages of text, 7 chapters, 19 figures and 1 tables.

## **Annotatsioon**

### **Eesti üliõpilaste peamised terviseprobleemid ja telemeditsiin**

#### **Eesmärk**

Viimase aastakümne jooksul on avaldatud mitmeid artikleid telemeditsiini tähtsuse kohta kaugemates piirkondades elavate inimeste ja vanurite tervishoiu edendamisel. Selles uuringus aga on vaadeldud üliõpilasi, kellel on mitmeid terviseprobleeme. Antud uuringu peamine eesmärk on välja selgitada, mil määral mõjutavad kolm peamist terviseprobleemide allikat – stress, alkohol ja uimastid – üliõpilaste elu ja kuidas telemeditsiin aitab neid probleeme lahendada.

#### **Meetod**

Autor on kasutanud kahte uurimismeetodit – üliõpilaste põhiliste terviseprobleemide uurimist kirjandusanalüüsi alusel ja viinud läbi küsimustiku. Mõlemaid meetodeid kasutatakse üliõpilastel esineda võivate terviseprobleemide välja selgitamiseks.

Uuringu küsimustikke jaotati erinevates ülikoolides üliõpilaste hulgas (Tallinna Tehnikaülikoolis, Tallinna Ülikoolis ja Euro Akadeemias). Neid küsimustikke kasutati terviseprobleemide määramiseks ja õpilaste seas telemeditsiini vajaduse hindamiseks.

#### **Tulemused**

Enamik üliõpilasi usuvad, et vaimse tervise, alkoholi ja narkootikumide tarbimise probleeme saab telemeditsiini teenuseid kasutades vähendada (vastavalt 67%, 66% ja 54%). Uuringust selgus, et 99% üliõpilastest tarvitavad alkoholi ja vaid 1% üliõpilastest ei tarbinud üldse alkoholi. Joobes olekus on olnud 34% üliõpilastest. Depressiooni tunnuseid ja sümptomeid kogevad mõnikord 49% üliõpilastest. Vaid vähestel üliõpilastel ei esine kunagi depressiooni tunnuseid ega sümptomeid. Ligi 96% ei ole uimastitest sõltuvad. Enamik õpilasi arvab, et telemeditsiini abil on neil arstiga konsulteerimiseks rohkem aega ja neil on võimalik oma terviseprobleeme põhjalikumalt ja vabamalt arstiga arutada võrreldes vastuvõtul käimisega

haiglates või esmatasandi arstiabikeskustes. Ligi 73% üliõpilastest on nõus, et sagedane nõustamine ja suhtlus arstiga telemeditsiiniteenuste abil aitab säilitada nende head tervist. Peaaegu kõik üliõpilased (97%) sooviksid kasutada telemeditsiini tervishoiuteenuseid, kui nad reisivad või lähevad ajutiselt mõnda teise riiki elama.

## **Järeldus**

Selles uuringus leiti, et enamik üliõpilasi on huvitatud saama telemeditsiini kohta rohkem teavet, kui ülikool neile seda pakuks. Samuti soovivad nad õppida telemeditsiini rohkem kasutama, kuna praegu kasutab telemeditsiini ainult 1% üliõpilastest. Samuti arvab suurem osa küsitletuist, et vaimse tervise, alkoholi ja narkootikumide tarbimisega seotud probleeme saab leevendada telemeditsiini abil.

Mis puutub õpilaste terviseseisundisse, siis paljud neist tarbivad alkoholi ning mõned osalevad joomingutel. Enamik õpilasi kasutab alkoholi või narkootikume, et end paremini tunda. Lisaks sellele kannatab suur osa tudengeid depressiooni all.

See uuring näitab samuti seda, et ka riik peab hoolitsema oma noorema elanikkonna tervise ja tervislikumate eluviiside parendamise eest. Riik peaks rakendama telemeditsiini, et vähendada tervishoiuteenuste osutamise seotud kulusid.

Lõputöö on kirjutatud inglise keeles 50 leheküljel ning sisaldab 7 peatükki, 19 joonist ja 1 tabelit.

## List of abbreviations and terms

OECD	Organization of Economic Growth and Development
TTU	Tallinn University of Technology
WHO	World Health Organization
UNODC	United Nations Office on Drugs and Crime
GPA	Grade Point Average
DALY	Disability Adjusted Life Years
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ID	Identity

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# 1 Introduction

Throughout the decade several articles have been published about the importance of telemedicine in promoting the health care for people living in remote areas and for the elderly aged population. In addition to this, the health of younger generation is equally significant. This study explains the biggest common healthcare challenges that are being faced by the young generation and how telemedicine helps in overcoming these problems in order to improve their health. Students are considered in this study as they can adapt the latest technology easily, future leaders of the country, responsible, sincere, truthful, dutiful and easily understand the importance of being living healthy [1]. Not only this but at later stages, if the young generation is familiar with the new advanced technology such as telemedicine, they further can educate their family member or friends by guiding them how to use the technology and also give relevant information about leading a healthy life. In Estonia, internet users are rapidly growing among which majority of the population using the internet is younger and middle-aged. So, it becomes easy for younger and middle-aged population to adopt telemedicine easily [2], [3].

In this research study, three most crucial factors such as stress, alcohol and drugs are taken into consideration which affects the lives of students [10]. These factors not only alter the student population of Estonia although it is also the leading problem faced by most of the countries in the world such as United Kingdom, Switzerland, United States of America, Australia and many more. The prime country of focus in this study is Estonia. The population of Estonia is on declining trend which is caused by the low fertility rate of having less than 2.1 children per women [38]. Subsequently, elderly aged population continues to increase with higher life expectancy and younger population continues to shrink. Moreover, this emerging situation assists in the majority of the population to live with health and social benefits along with pensions. Most of the population is going to be dependent due to which health care and social expenditure is continued to be on rising stage (See Appendix 1). So, students at the later stages have greater responsibilities to contribute to the country by paying taxes and this is possible only when the students are healthy.

## **1.1 Purpose of study**

The main consideration of this study is to find out to what intensity the three essential sources such as stress, alcohol and drugs are going to affect the student life and how telemedicine is advantageous in resolving these issues [10]. This study also finds out whether the modern generation is willing to accept the concept of telemedicine or not. In this research, a group of university students of Estonia are taken into account. This research comes out with the clear picture of the effectiveness of stress, alcohol and drug on student health. Moreover, this study reveals the information about the consequences of telemedicine among young generation [6].

## **2 Theoretical framework**

### **2.1 Overview of Estonia**

Republic of Estonia (Eesti Vabariik) is located in the northern part of Europe and lies in the Baltic region. This country is bordered on East, West, North and South by Russia, Baltic Sea, Gulf of Finland and Latvia respectively. In addition, it is covered in 45366 sq. km which includes the mainland and 2222 islands. Furthermore, it is the least crowded member state in the European Union region having population of 1300000. Citizens of Estonia are entitled to have certain benefits such as free education, universal healthcare system and providing longest paid maternity leave in OECD. Additionally, it has become one of the most developed IT systems with world's most advanced digital society as well as the first country to provide E-residency. However, it is having the world's highest literacy rates in the world and became the first nation in the world to hold elections over the internet. The biggest gaming Software Company Playtech (1999), online communication software Skype (2003), and fastest folding scooter in the world named Stigo bike were founded in Estonia. Together with this, there are plenty of more popular inventions and startup companies established in Estonia such as transfer wise, guard time, Grabcad, Pep drive, Skeleton Technologies and Adcash which in turn form this country to be one of the top startup the nation in the world with more than 350 startup companies [4].

### **2.2 Healthcare system of Estonia**

In Estonia, Ministry of Social Affairs and its agencies are responsible for all over health policies and public health policies. They are all responsible for health protection legislation and supervision of health law enforcement. They also maintain the healthcare provision. They provide public health programmes and also plan for health care services for uninsured persons. The insurance fund helps in the area of administration of the Ministry of Social Affairs. Therefore they work as the independent legal body under public law.

The main duties of the Health Insurance Fund are to provide payments for the provision of care among the people having temporary incapability for work. The pillars of the Estonian health care system are the separation of health care services and funding, however, they achieved the independent Health Insurance Fund which plays no direct role in managing the medical institution. Health Insurance Fund is not representing the hospital advisory board. This separation of the healthcare providers and funders guarantee funding decisions and focus on the meeting the treatment needs of the insured and un-insuring the health insurance money for the designated purpose. Whereas the health care providers work under private laws, however hospitals are owned by the public sector. In this manner service providers manage efficiently. In Estonia, each person that visited doctor has their E-health record online and that can be tracked. This system is functioning the centralized and national database. The E-health record retrieves the data from various providers who are using a different system and maintain in the standard format by E-health portal (link) and doctors can access the patient record easily from the single file. In emergency cases, the doctor can use a patient ID code to read and check the blood type, allergies, recent treatments, ongoing medication and pregnancy. And with this, the ministry can measure health trends (Track epidemics) and check that whether their health resources are wisely spent or not. On the other hand, patients can check their own health records as well as their children records by log into e- portal with their ID card; they can also see their prescriptions [5].

### **3 General description and types of telemedicine**

The word Tele' originates from the Greek word which means distance [46]. Telemedicine is transferring the electronic information over the distance for the betterment of the health. Correspondingly, with the help of telemedicine communication between the two physicians is possible in order to exchange the patient data or for discussing the patient problem via video conferencing is possible. In general, the four most common types of telemedicine are live video conferencing, store and forward consultation, remote patient monitoring and mhealth [47].

#### **4. Advantages of telemedicine among the university students**

With help of telemedicine, students are able to receive the instant reply from the physician about the queries related to their health issues. Moreover, it helps in facilitating 24/7 health care services to students. Facilitates, effortless access to the top licensed health care professional for diagnosis, treatment, referrals to specialists and medical prescription whenever required. Additionally, it is found to be effective in preventive care. It is associated with the wellness and behavioral health programmes which support the overall health of the student population. Telehealth consultations help in eliminating the unnecessary wastage of timing in waiting for appointments for general medical checkup. Likewise, it helps in reducing the costs of infrastructure if, health care services are to be provided within the university or college premises. Transferring the data of the students through the electronic system is the safest way. Not only this, the parents also found to be mentally satisfied that their child is having the best medical service accessibility all the time. College students need privacy and autonomy over their healthcare. Correspondingly, the student can connect with the highly qualified physicians in few minutes by maintaining the privacy of their own room for one to one video or phone consultation. Furthermore, it eliminates the worries about anyone else overhearing the student's medical information in a crowded hospital or campus clinic. Receiving healthcare within the room helps in eliminating the chances of being caught by additional illness because of being exposed to the germ-ridden waiting rooms. Easy follow up regarding the medical issues helps in connecting to the physician with unlimited number of time. Online medical prescriptions and pharmacy help the students to get their medicines at the nearest pharmacy. A frequent conversation between the doctor and students help in improving the doctor-student relationship and student feel empowered to manage their care. Problems related to stress, drug and alcohol addiction can be overcome by conducting online video counselling between the highly specialist psychiatrist and the students [6].

## **5. Methods and materials**

### **5.1 Literature research**

First of all, according to the qualitative research design several research methods were identified. For example data collection, literature review, survey and comparative research. All these methods or research techniques help to figure out the research finding and final result. In this thesis, the author has used two research methods such as literature analysis of main health problems of students and questionnaire survey. Both methods are used to figure out the healthcare challenges that are being faced by students. At the beginning of the work, literature research was done by the author to identify the main issues concerning the thesis topic. Through literature research method, the author is able to find out the information concerning this problematic situation. For identifying the real root cause of the problems faced by the students, the author refers to various newspapers, articles, and various important websites. The author first collected all the relevant information regarding the health issues faced by students in Europe. Moreover, the author comes out to a conclusion that there are three most important factors such as stress, drug and alcohol which affect the life of the majority of the population. For gathering more information related to these crucial problems, the author starts collecting information of other countries such as the United Kingdom, United States of America, Canada and Estonia. It took almost six months, which is from December 2016 to May 2017 to collect relevant information concerning health issues of students. After collecting all the relevant information concerning health issues of students across the world, the author comes out to a conclusion that, this problem is most common among all the countries. In Estonia, when information is collected on the basis of age group, it concludes that majority of the young and middle-aged population is strongly affected by this (See Table 1).

**Table 1. List of resources of three important factors which affect the lives of students.**

Sr. No.	Factors affecting student health	Keywords and references	Name of Website	Country
1	Stress	Mental Health Disorders (DALYs), WHO Europe 2012 [10].	World Health Organization	Europe
		Estonia DALYs, WHO 2012 [10].	World Health Organization	Estonia
		Estonia non-communicable DALYs, WHO 2012 [10].	World Health Organization	Estonia
		Estonia mental and behavior disorder, DALYs 2012 [10].	World Health Organization	Estonia
		Estonia mental and behavior disorder DALYs by age group, WHO 2012 [10],	World Health Organization	Estonia
		In which countries does mental health have the most impact [11]?	The Guardian	World
		Mental health issues [12].	The Guardian	The United Kingdom
		The College Student Mental Health Crisis [13].	Psychology today	The United States of America
2	Drugs	Highest overdose and Drug Deaths in World, 2016 [17].	World Atlas	World
		World drug-related deaths [18].	ERR News	World
		Drug Deaths in Europe, (EMCDDA) [19], [20].	Postimees	Europe
		Estonia Drug use disorder, WHO (DALYs) 2012 [10].	World Health Organization	Estonia
		Students used to take drugs to get high [24].	The Guardian	The United Kingdom
		One in seven students has dabbled in 'smart' drugs [25].	Science Daily	Switzerland

3	Alcohol	Country Ranking by alcohol consumption, 2016 [29].	World Health Organization	World
		Alcohol use disorder DALYs, WHO (2012) [10].	World Health Organization	Estonia
		The United Kingdom alcohol consumption graph [30].	Office for National Statistics	The United Kingdom
		Heavy drinking, by age group and sex [32].	Statistics Canada	Canada
		Alcohol facts and statistics [33].	National Institute on alcohol abuse and alcoholism	The United States of America

## 5.2 Study design

The data for this study were collected from the different universities (Tallinn University of Technology, Tallinn University and Euro Akadeemia) of Tallinn from 10 July 2017 to 15 October 2017. Moreover, it is based on a qualitative survey conducted with students of all age groups studying in universities.

## 5.3 Participants

For this study, the data from students of all age groups studying in universities were collected. Whereas, all the lecturers and other university staff members are excluded from this study. Those students who do not understand English, for them the survey questionnaire is being transformed in the Estonian language for their convenience. The total of 246 students was targeted in data collection for the study.

## 5.4 Data collection

Students of all age groups are taken into consideration for this study. The survey questions were dispersed among students in both English and Estonian languages.

The first part of the questionnaire includes demographic information such as name and age. And in the second half, the following questions were comprehended in the survey questionnaire (Source-Author)

- 1) Do you expect that mental health problems can be minimized by using telemedicine services?
- 2) Do you think that alcohol consumption intake problems can be decreased by using telemedicine services?
- 3) Do you consider that drug intake problems can be reduced by using telemedicine services?
- 4) Where do you first prefer to visit for medical consultation?
- 5) Are you interested to know further about telemedicine, if your university will provide additional information?
- 6) Do you agree that telemedicine will help you for well-being in future?
- 7) Do you think that 24/7 telemedicine service helps you in saving your time and money?
- 8) Do you think if this service is available on university campus then it is easier for students to understand and use these services in the better manner?
- 9) Do you think it helps in maintaining the privacy?
- 10) Do you agree with the statement that "Students get more time for consultation with a doctor and ask all their query freely as compared to the hospitals or in primary care centres where doctors have limited time"?
- 11) Do you agree with the statement that "Frequent counselling and interaction with the doctor through telemedicine services will help in maintaining good health of students"?
- 12) Do you wish to stay connected with health care services even when you are travelling or moving to some other countries?
- 13) Which is the most convenient way for you to use telemedicine services?

- 14) Are you using any telemedicine services? If yes then please mention the name.
- 15) How often do you drink?
- 16) Do you engage in binge drinking? (5 or more drinks in a sitting)
- 17) During the past 12 months, how often have you been so worried about something that you wanted to use alcohol or other drugs to feel better?
- 18) Do you feel any signs or symptoms of feeling depressed in the last year?
- 19) Are you addicted to any drug?

The survey questionnaires were completed from 10<sup>th</sup> July 2017 until the end of the 15<sup>th</sup> October 2017.

## **5.5 Ethical consideration**

For this study, permissions were taken from the university lecturers of Tallinn University of Technology in order to conduct the survey before their lectures. Also, verbal approval was taken from the dean of Euro Akadeemia in order to conduct the survey online. The student center at Tallinn University also helped in conducting the survey. The main purpose of the study was informed to all the students before conducting the survey.

## 5.6 Result analysis

Sr.No.	Questions	Yes	No
1)	Do you expect that mental health problems can be minimized by using telemedicine services?	165	81
2)	Do you think that alcohol consumption intake problems can be minimized by using telemedicine services?	162	84
3)	Do you consider that drug intake problems can be minimized by using telemedicine services?	132	114
4)	Are you interested to know more about telemedicine, if your university will provide additional information?	210	36
5)	Do you agree that telemedicine will help you for well-being in future?	216	30
6)	Do you think that 24/7 telemedicine service helps you in saving your time and money?	213	33
7)	Do you think if this service is available on university campus then it is easier for students to understand and use these services in the better manner?	204	42
8)	Do you think it helps in maintaining the privacy?	153	93

9)	Do you agree with the statement that "Students get more time for consultation with the doctor and ask all their queries freely through telemedicine as compared to the hospitals or in primary care centers where doctors have limited time"?	216	30
10)	Do you agree with the statement that "Frequent counselling and interaction with the doctor through telemedicine services will help in maintaining good health of students"?	180	66
11)	Do you wish to stay connected with health care services even when you are travelling or moving to some other countries?	240	6
12)	Are you using any telemedicine services? If yes then please mention the name.	9	237
13)	Do you engage in binge drinking? (5 or more drinks in a sitting)	84	162
14)	Are you addicted to any drug?	9	237

15) Where do students first prefer to visit for medical consultation?

As per the survey results among the students, it is concluded that 38%, 33% and 39% of the students first prefer to visit the hospital, general practitioner and online respectively (See Figure 1).

### Student preference to visit for medical consultation

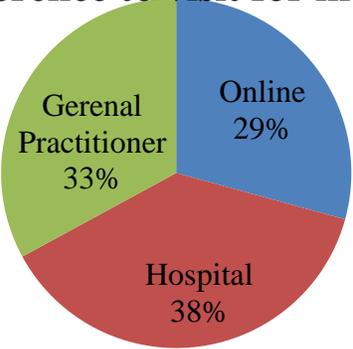


Figure 1 (Source-Author)

16) Which is the most convenient way for students to use telemedicine services?

Majority of the students shows the preference of using telemedicine through smartphone application and video conferencing with 31.7% and 29.26% respectively. While 21.95% of the students prefer to receive these services through the web portal. And in the last 14.63 % and 2.43% of the students are interested to use via telephone and virtual world (See Figure 2).

### Most convenient ways for students to use telemedicine services

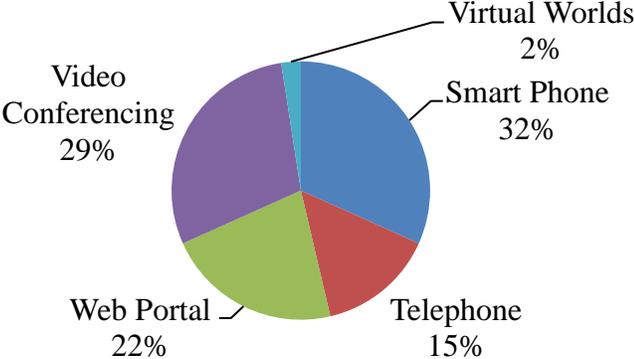


Figure-2 (Source-Author)

17) How often do students drink?

Majority of the students drink alcohol on the special occasion with 60.9%. 15.8% of the students mentioned that they drink alcohol every day. Students which consume alcohol 3-5 times a day and once in a week are 10.9% each. However, 1.21 % students never had alcohol (See Figure 3).

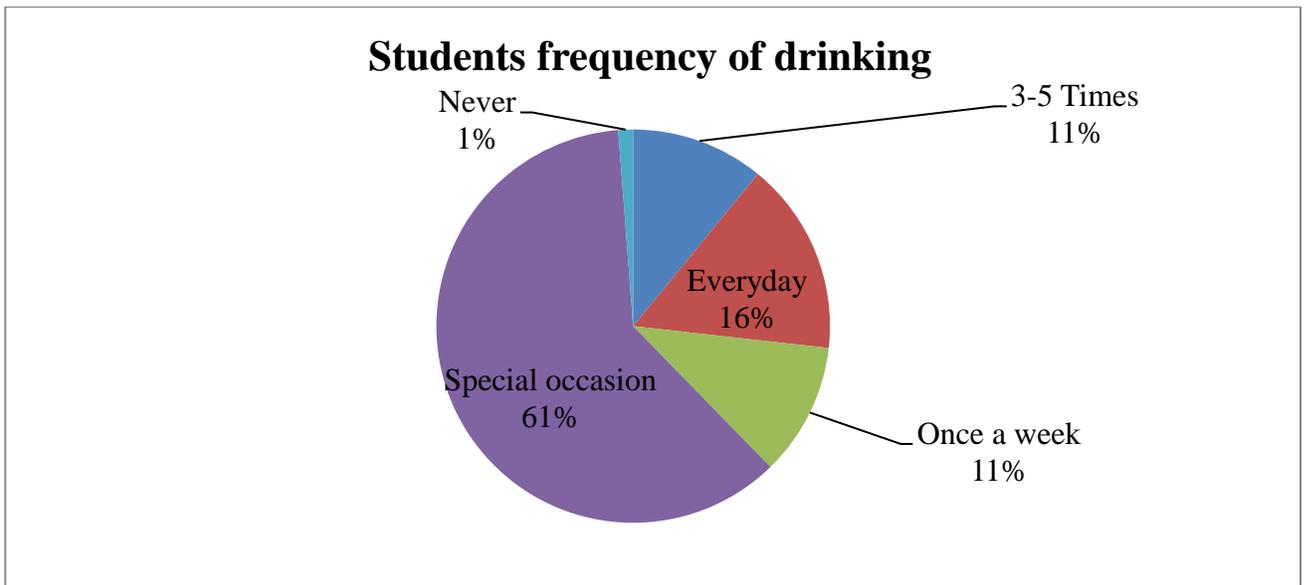


Figure 3 (Source- Author)

18) During the past twelve months, how often have students have been so worried about something that they wanted to use alcohol or other drugs to feel better?

46.3% of the students respond that they never take alcohol or other drugs to feel better. While 31.7% responds that sometimes they take, 17.07% rarely and 3% most of the time and 2.43% always they take alcohol or other drugs to take alcohol (See Figure 4).

### Student worry of something that they wanted to use alcohol or other drugs to feel better?

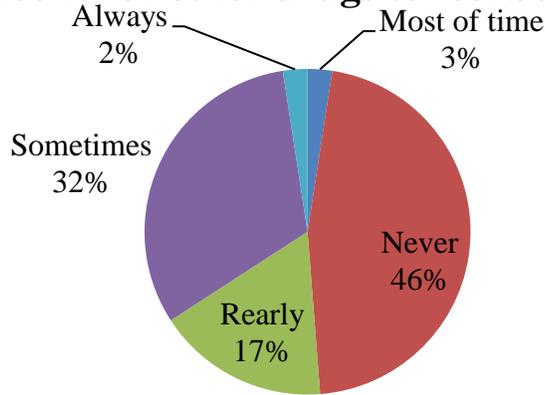


Figure 4 (Source-Author)

19) Do you feel any signs or symptoms of feeling depressed in the last year?

The highest proportion of the students responds that sometimes they feel signs of depression in the last year with 48.7%. On the other hand, a student feels signs of depression rarely with 23.1%, most of the times with 4.87% and always with 1.21%. Only 21.9% students never experience signs of depression in the last one year (See Figure 5).

### Percentage of students feeling depression in last year

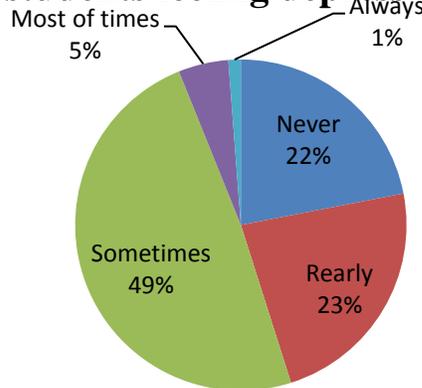


Figure 5 (Source - Author)

## **6 Discussion**

The major aspects which affect the health of the students are stress, drug and alcohol.

### **6.1 Stress**

The essential reasons for the stress among the university students who come to the university for enhancing their qualification face major challenges which cause stress is when they move into the new era, getting separated from the family and friends, established of new social work, affordability, managing family with studies and coping with the different environment. However, it is most common among the university students as they have to perform various activities either in the form of presenting presentations, preparation of examination or to submit the assignment on time before the deadline [7]. Without taking stress it is not possible to execute the work, so it is also necessary to some extent. Moreover, if too much stress is taken into the account then it affects the health of the student.

The mental disorder affects one in every four people in the World. Correspondingly, depressive disorder is the fourth major cause of the global disease burden [8]. Depression affects every 1 out of 15 persons in WHO European region [9]. The full form of DALY is disability-adjusted life years; it is the measure of the number of years lost by living with the disease. The below bar graph indicates the list of top 25 diseases that contribute to the disability-adjusted life years. Moreover, it indicates that unipolar depressive disorder (11.97 million population) is the third largest common disease in the whole European region which comes after ischemic heart disease (44.08 million population) and stroke (23.03 million population) (See Figure 6).

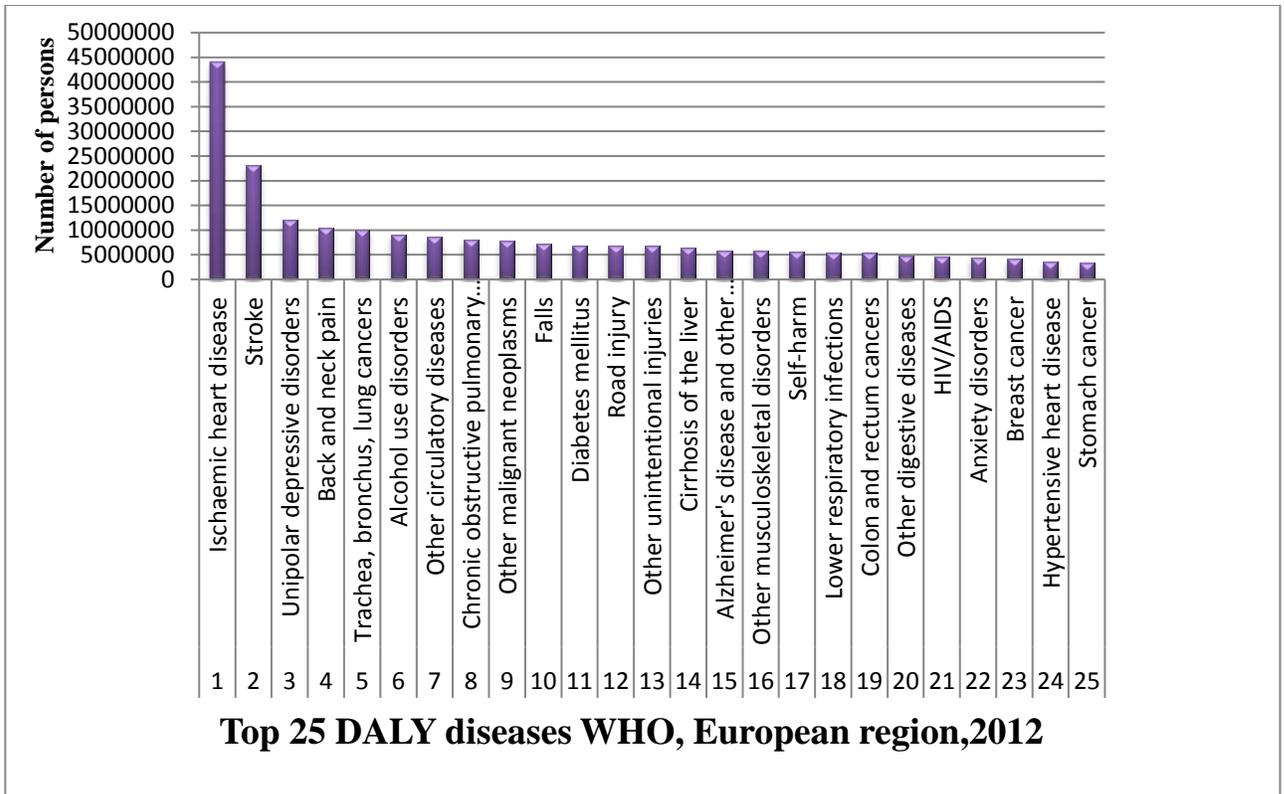


Figure 6 World Health Organization, Europe 2012.

The following graph represents that the number of persons living with the unipolar depressive disorder in Europe with 11.97 million of the population is at the first position which causes DALYs under the category of Mental Health Disorders. Furthermore, alcohol use (9 million), anxiety (4.3 million) and drug use disorder (2.6 million) contributes to the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> position [10] (See Figure 7).

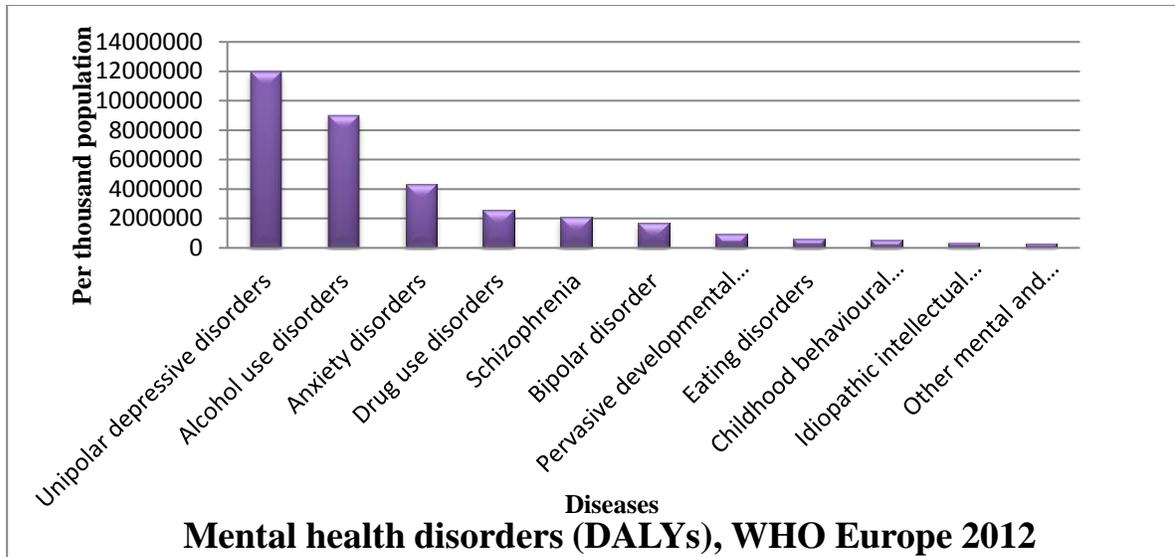


Figure 7. World Health Organization, Europe 2012.

In, Estonia majority of the population falls under the category of non-communicable diseases living with DALY. Non-communicable disease contributes to 412.4, injuries 43.1 and communicable, maternal, prenatal and nutritious conditions with 25.4 causes of DALYs [10] (See Figure 8).

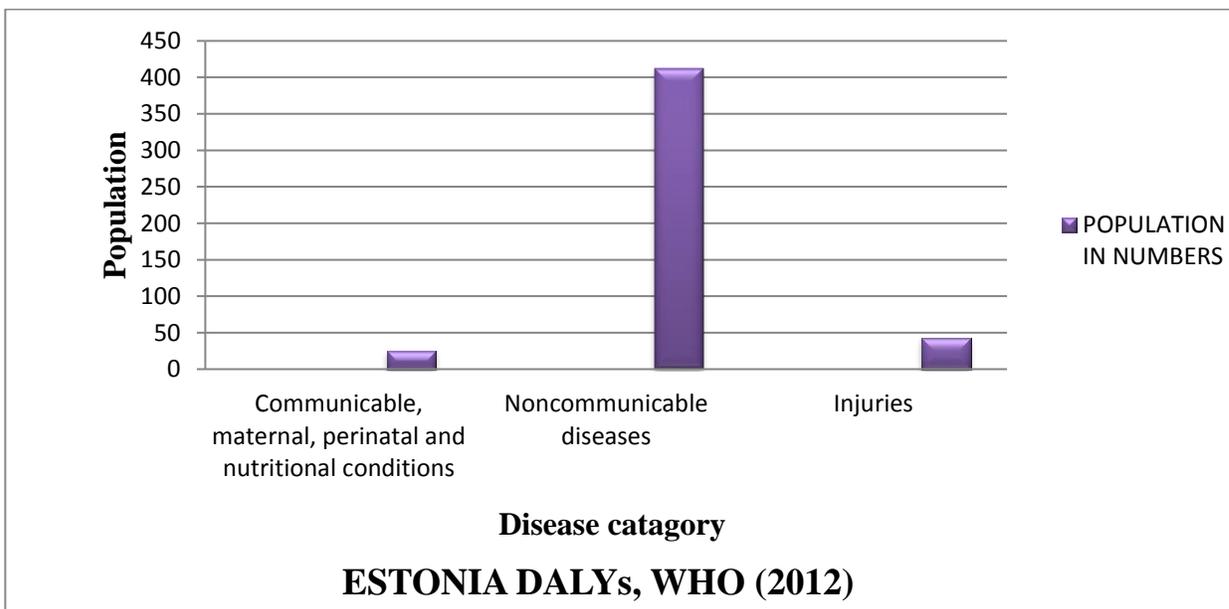


Figure 8. World Health Organization, Estonia DALYs 2012.

Under the sub-category of the non-communicable diseases in Estonia, it is found that mental and behavior disorder is the third leading cause of 44.5 persons per thousand population with cardiovascular on the first position and malignant neoplasms on second position with 75.4 and 45.4 persons per thousand population causes of DALYs [10] (See Figure 9).

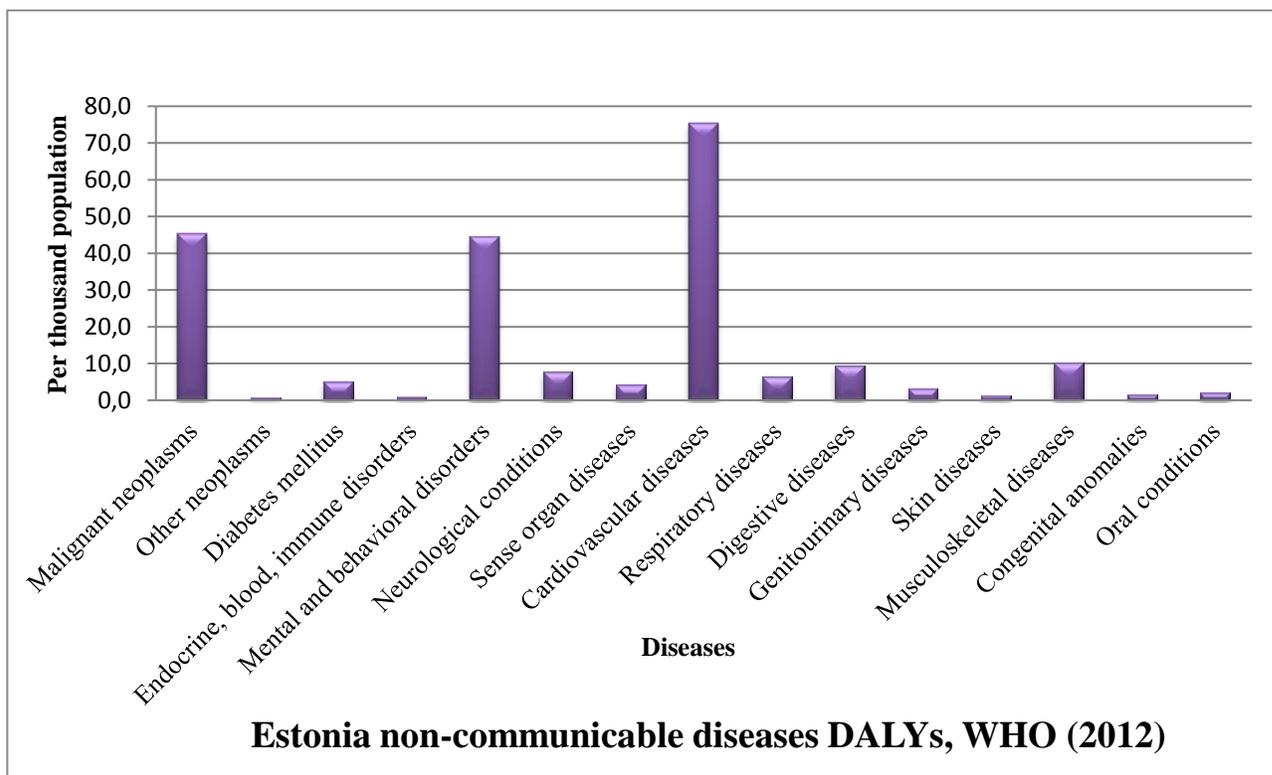


Figure 9 World Health Organization, 2012.

After getting into the depth of the further subcategory of mental and behavioral disorder in Estonia, it is explored that there are three main causes of DALYs such as alcohol use disorder, unipolar depressive disorder and drug use disorder[10] (See Figure 10).

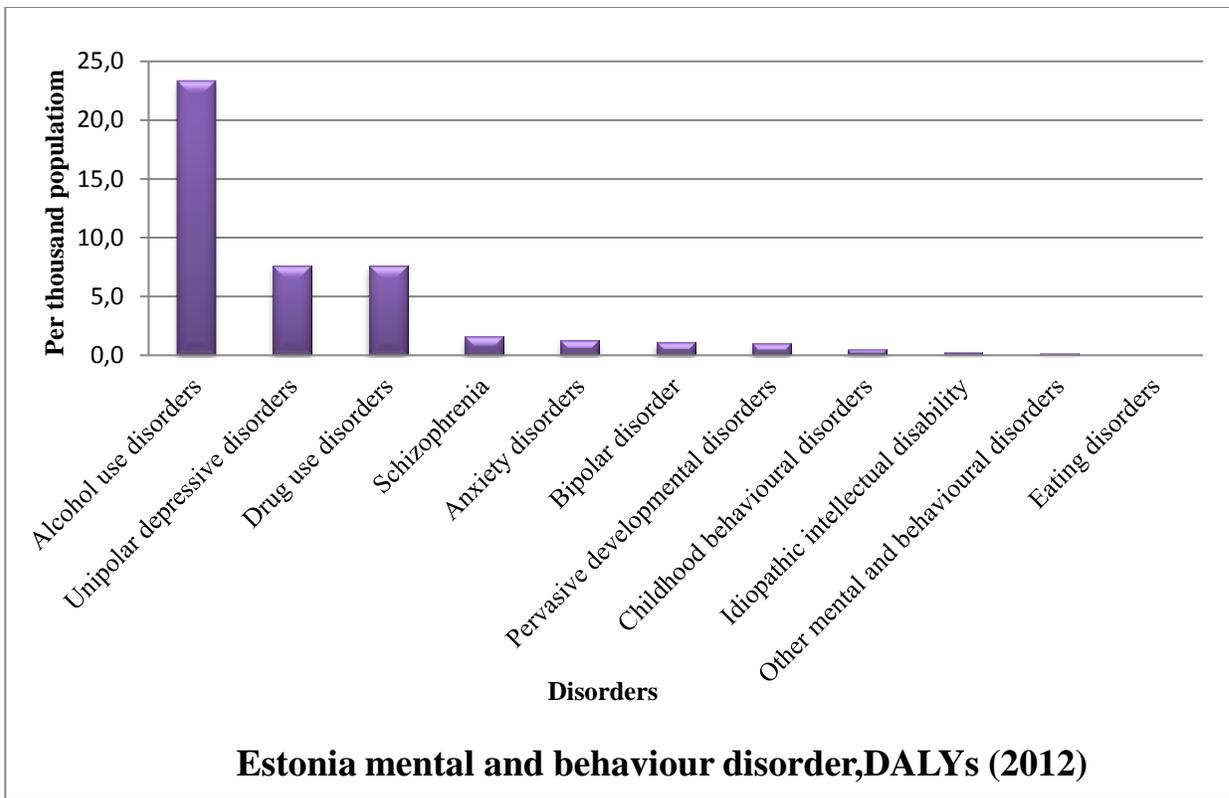


Figure 10. World Health Organization, Estonia 2012.

When considering the cause of DALY by age group in Estonia, then below mentioned graph illustrates that the majority of people who are living with mental and behavior disorder are in between the age group of range from 30 to 59 and 15 to 29. Furthermore, this means that a large number of middle age or young age group people are facing this problem [10] (See Figure 11).

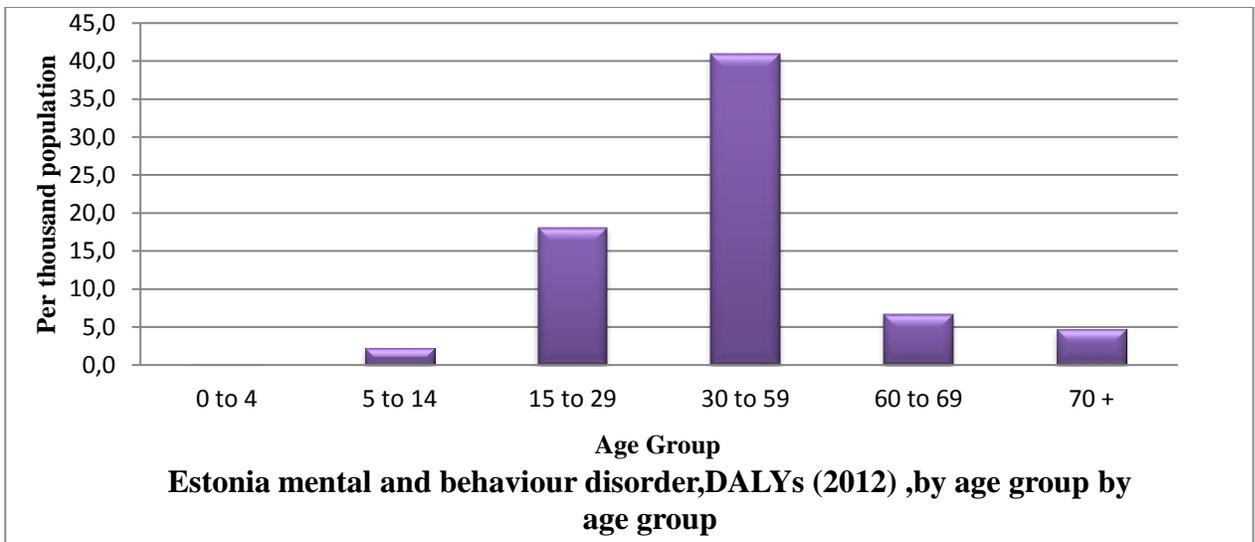


Figure 11. World Health Organization, Estonia 2012

As well as, according to the world ranking of the population living with the DALYs on basis of the length of hours, Estonia is on number 1 position with 5640 hours of life lost by living with the disease followed by Belarus and Russia with 5611 and 5591 hours lost [11] (See Figure 12).

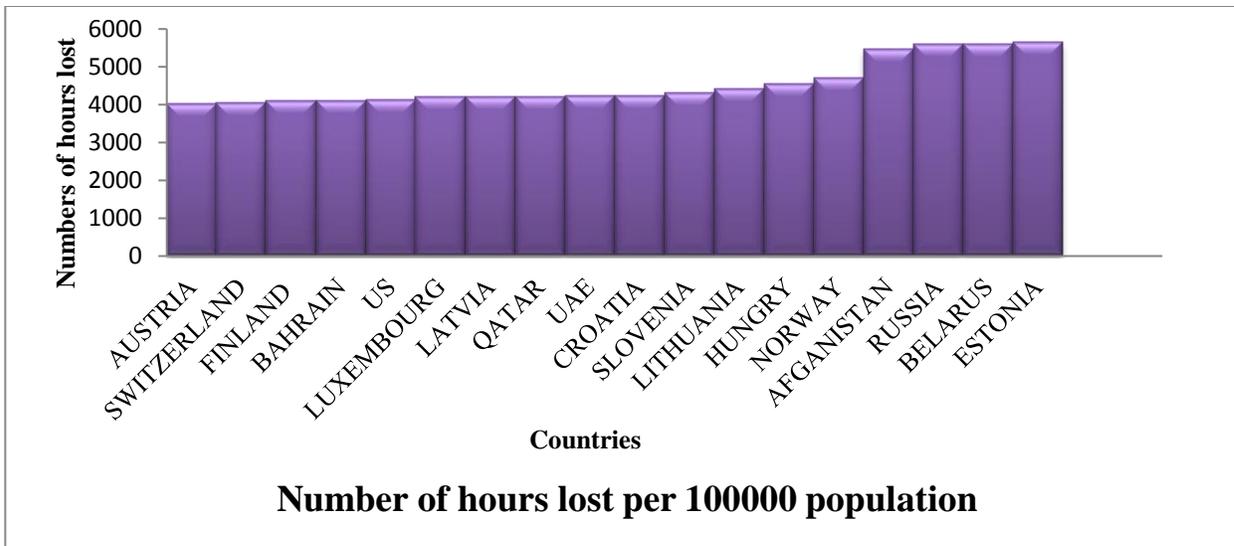


Figure 12. The Guardian, 2015.

In the United Kingdom, eight out of ten students were having mental health issues and 33% have suicidal thoughts as per the survey conducted by the National Union of students in the year 2015. Out of 1093 students surveyed, 54% of the students experiencing the mental health problem do not receive any support, 40% felt nervous about seeking aid from institution and rest of the students do not know how and from where to obtain mental health support from the college or university [12]. According to the survey conducted in the year 2004 by the University of California, it concludes that 45 % of the students experiences the emotional or stress-related problem in the last 12 months which affect their health and wellbeing along with the performance at the university [13]. The University of Minnesota experiences a significant increase in the number of students with mental health diagnosis from 25% in 2007 to 33% in the year 2015 [14].

All above data collected from different countries such as Estonia, United Kingdom, United States of America comes on to a common statement that the student population of their country is experiencing the same problem of stress. Although, Estonia is in the top position for the population living with 5640 years of life lost by living with the disease [11]. Additionally, the proportion of young and middle-aged group population is higher for people living with mental and behavior problems [10]. The student population also comes from this group. So, when it comes to relating with the author research study, positive response has been found justifying the above research studies that 77.8% (Sometime-48.7%, rarely-23.1%, most of the time-4.87% and always 1.21%) of the students have signs and symptoms of feeling depressed in the last year. Furthermore, it indicates that majority of students experiences the problem of depression. Besides all the above results, it is being found that students need telemedicine for the betterment of their health as they are facing problems of depressions. Moreover, they need regular counselling with the doctors to keep them healthy. The most preferred mode as per the students is communicating with the doctors through video conferencing (29.26%) and mobile applications (31.7%).

## 6.2 Drugs

The second most essential reason that affects the health of the student is consumption of drugs. From the numerous resources, it is found that there are a number of reasons which inspire students to consume drugs such as for enjoyment, to relieve stress, depression, social anxiety, for performing better and to experiment. Additionally, the use of drugs helps in minimizing the feelings of distress. Stress is the major factor which is taken into consideration in starting, continuing and for those who are recovering from addiction. Nowadays, prescription drugs are becoming more and more popular among the college student. Some students refer to these drugs as 'SMART DRUGS'. Moreover, these types of drugs help in improving the performance of the students by boosting their energy to study the late night before examination for getting good GPA. Majority of the students feel excited to experiment new things which they don't try in their life. Taking drugs is also one of the interesting topics to discuss among the college a student which develops the interest of students towards the drugs [15] [16].

The rate of consumption of drug overdose and its related deaths are very high in some parts of the world. The below-mentioned bar graph shows the list of top ten countries which are experiencing the highest drug overdose and its related deaths. Correspondingly in this list, Iceland is at first position with 221.5 per million population followed by Estonia (198.1 per million population), United States (190.8 per million population), EI Salvador (160.9 per million population) and Uruguay (104.7 per million population) with 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> positions respectively [17] (See Figure 13).

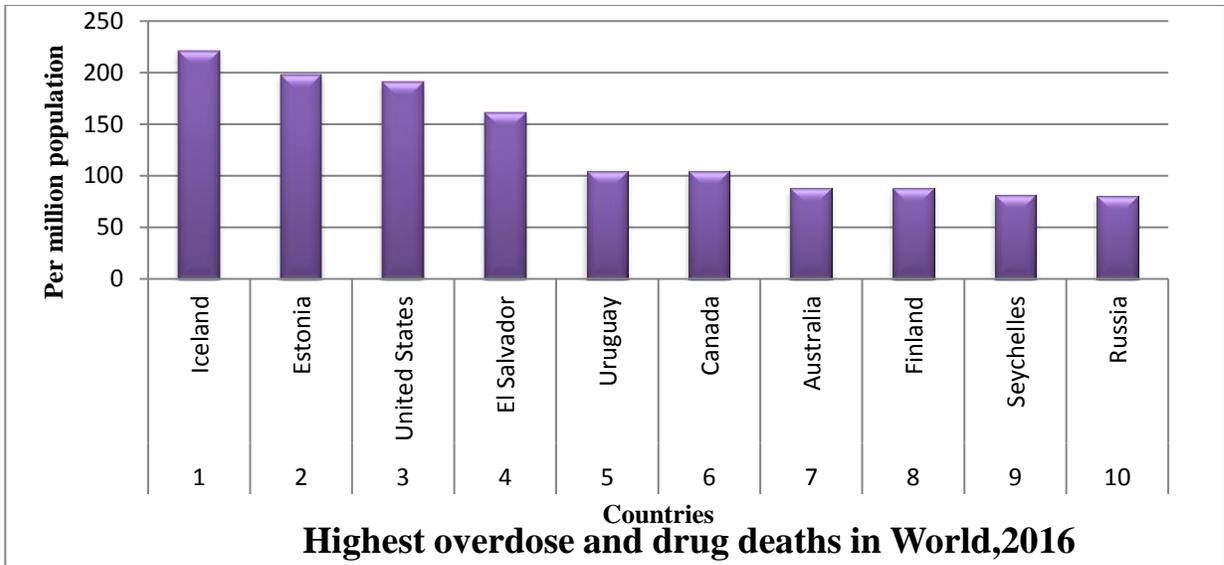


Figure 13. World Facts, 2016

The following bar graph illustrates the consistent growing trend of the drug users across the world from the year 2006-2012. In the year 2006, there were 208 million of drug users and this figure raise up to 243 million of drug users in 2012. From these figures, it is being concluded that over the years the percentage of the population using drugs is expanding day by day [18] (See Figure 14).

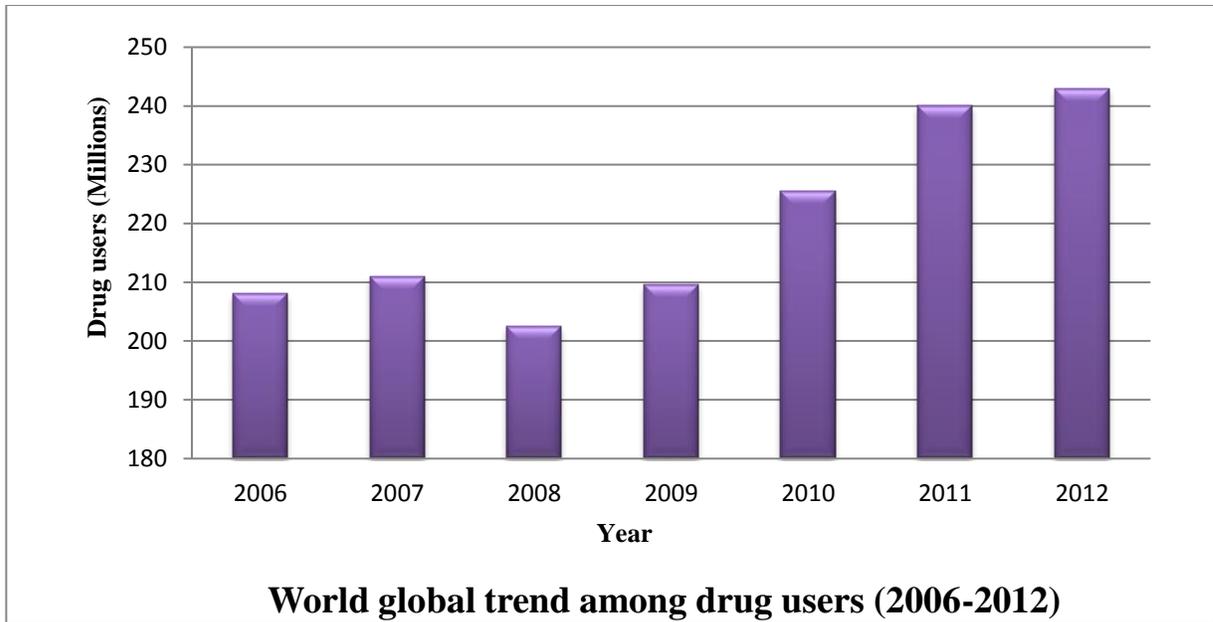


Figure 14. Estimates based on the UNODC report.

Among European countries, Estonia is in the first place contributing the maximum numbers of drug deaths in the year 2011 and 2012 (As per EMCDDA report) [20]. Moreover, in 2011, Estonia was having drug deaths with 135.7 per million population and similarly in the year 2012, this value increases up to 190.8 per million population. This further concludes that within one year Estonia had experienced almost 55.1 per million population rise. This rise of deaths due to Drugs is found not only among Estonia, but other countries also such as Norway, Finland, Ireland and Lithuania except United Kingdom [19] (See Figure 15).

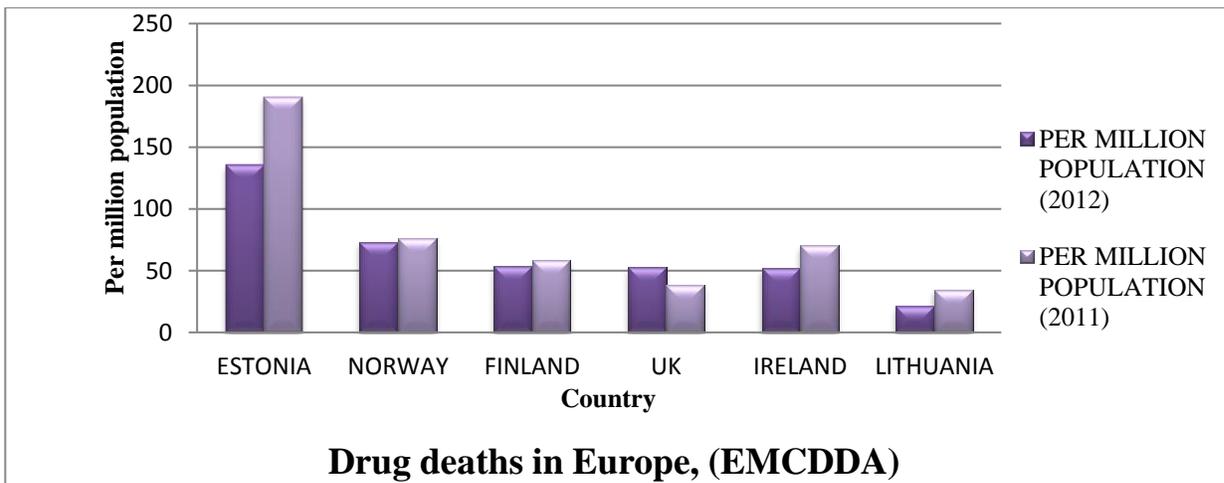


Figure 15. European drug report (EMCDDA), 2013.

Estonia ranks at 5<sup>th</sup> position in the world in terms of drugs related deaths [21]. As per the report of WHO (2012), in Estonia, the major cases of the population living with disorder due to drugs is more common among the young generation of age group ranging from 15-29. The younger generation in Estonia was having 3.9 per thousand populations living with drug use disorder (DALYs) [10] (See Figure 16).

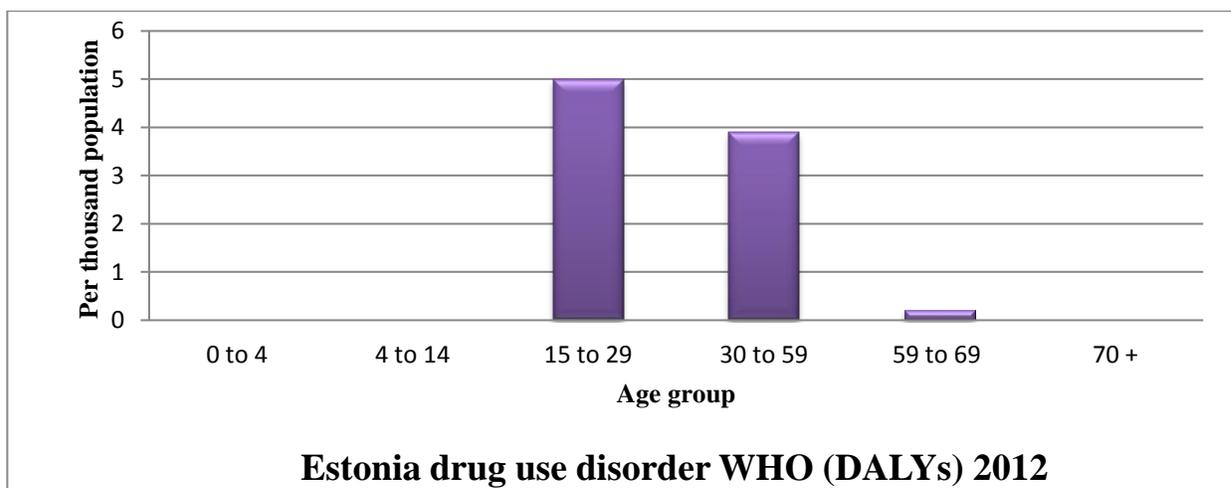


Figure16. World Health Organization, DALYs 2012 report.

Additionally, as per the report of 2012 by European Drug Centre for Drugs and Drug addiction, Estonia had 191 drug deaths per million. In 2013, Estonian death rates due to drugs were eight times higher than the European average [22]. Estonia is one of the worst countries in Europe for having the highest number of drug deaths in the year 2014, with 191 per million drug deaths per population. Whereas on the other hand, Norway and Ireland are at 2<sup>nd</sup> and 3<sup>rd</sup> positions respectively [23]. According to the article published in the British newspaper, now a day's majority of the students are taking drugs in order to improve their performance. The article explains the reasons for taking prescription drugs among different students of United Kingdom. In this competitive world, students have to maintain the pace of performance levels at the highest level in order to achieve goals of their life so, in order to achieve maximum the students have to be dependents on these prescriptive drugs [24]. In Switzerland, one out of seven students had tried smart drugs in the year 2013. In one survey conducted by the University of Zurich in Switzerland which takes 6725 students for accessing whether they have tried any drugs in order to stimulate their brain for improving their performance in studies. In that survey, students of 23 years of age group were taken into consideration. And as far as the outcomes of the survey are concerned, it was found that almost 94% of the students are known for the

neuroenhancement. The most common substance used by alcohol with 5.6% of the students, followed by Ritalin which contributes to 4.1% of the students, sedatives and soporifics (2.7%), cannabis (2.5%), beta-blockers (1.2%), amphetamines (0.4%), and cocaine (0.2%) [25].

The consumption of the drugs is continued to be on increasing trend from the year 2006 to 2012 in the whole world [18]. Among the study conducted in the United Kingdom and Switzerland, it has been found that majority of students consume drugs in order to enhance their performance in the studies. And on the other hand, Estonia has been found to be in the first position related to drug deaths in the year 2011 and 2012 as indicated by EMCDDA [20]. Estonia is at second position among the consumption of drug overdose and its related deaths (198.1 per million populations) in the year 2016 [17].

According to the reports of WHO, in Estonia majority of the population living with drug disorders are young and middle-aged [10]. This further clarifies that majority of student's lies in this category of age group. But, as per the survey results conducted by the author, it is being found that only 3.81% of the students agree that they are addicted to drugs. This may be due to the reason that they don't want to disclose their personal information due to some other reason. And also, 132/246 (54%) of the students admitted that drug intake problems can be minimized by using telemedicine.

### **6.3 Alcohol**

When the students enter into the college life and interacted with the student of the same age is more prone to take up the risks which can affect their health because in college parents influence is minimum. Students inspired by media think that drinking alcohol from moderate levels to the large amount will make them feel more enjoyable. College students did not know the consequences of the excessive alcohol consumption. The main reasons for drinking alcohol by the college students by asking the questionnaire with the corresponding feedback in the form of Yes or no (Centre for Outsourcing Research & Education Canada, 2011) are breaks the ice (74.4% ), enhances social activity (74.4% ), gives people something to do (71.7% ) , gives people something to talk about (66.6%), allows people to have more fun (63.1%), facilitates male bonding (60.1%), facilitates a connection with peers (61.7% ), facilitates sexual

opportunities (53.0%), facilitates female bonding (28.8%), makes women sexier (28.8%), makes food taste better (22.7%), makes me sexier (20.4%) and makes men sexier (19.9%) (24). During the college time, students had more rights to take his/her own decision without much influence of the parents and whenever they want to enjoy they can throw the parties anytime anywhere or they can visit the nearest pub for the enjoyment [26]. The major cause of death and disability in early life is alcohol. Among the age group of 20 – 39 years approximately 25 % of the total deaths are due to alcohol consumption [27]. Alcohol consumption contributes to 2.5 million deaths annually. Excessive intake of alcohol consumption further also results in more millions of illness and injuries among the younger generations and people in developing countries.

In the world, almost 4% of the deaths are related to alcohol. The major category of the deaths caused by alcohol is injuries, cancer, cardiovascular diseases and liver cirrhosis. In between the age group ranging from 15-29 years, almost 320000 young people were died annually from alcohol-related causes and contribute 9% of all deaths in that age group. Among disease burden, alcohol is the third largest risk factor and Europe come at the second position in terms of leading risk factors due to alcohol [28]. In world, as per the ranking of the consumption pattern (2016) Estonia is having the highest consumption rates with 14.97 liters of pure alcohol consumed per capita followed by several other countries such as Belarus, Lithuania, Andorra, Czech Republic, Austria, Ireland, France, Luxembourg and Hungary are the top ten countries with 14.69, 14.3, 13.31, 12.47, 11.90, 11.75, 11.40, 11.28 and 11.21 liters of alcohol per capita consumption respectively (See Figure 17).

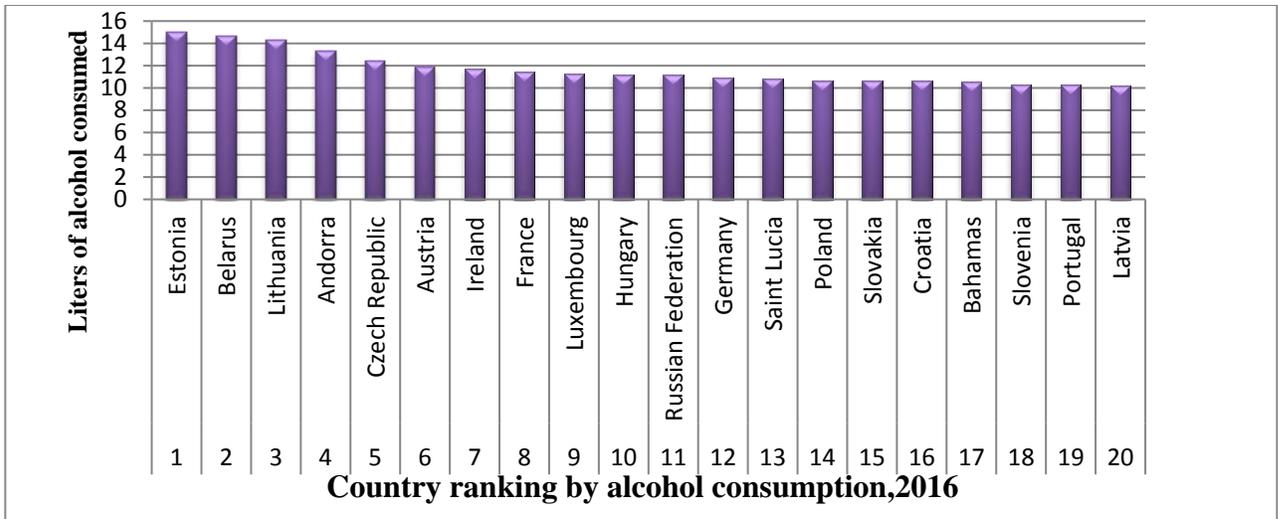


Figure 17. Data and fact sheet (Alcohol) WHO, 2016.

WHO European Region has the highest number of total ill health and premature death due to alcohol in the world. EU is the heaviest drinking region in the world with one-fifth of the 15 years and above population had experienced the heavy drinking at society level [29].

In Estonia people living with alcohol use disorder (DALYs) among the age, 30 to 59 is found to be maximum with 19.2 per thousand populations. And on the second position, the age group from 15 to 29 is found to be 5.7 per thousand populations. So, the majority of the population living with the alcohol use disorder is found to be maximum among young and middle-aged people [10] (See Figure 18).

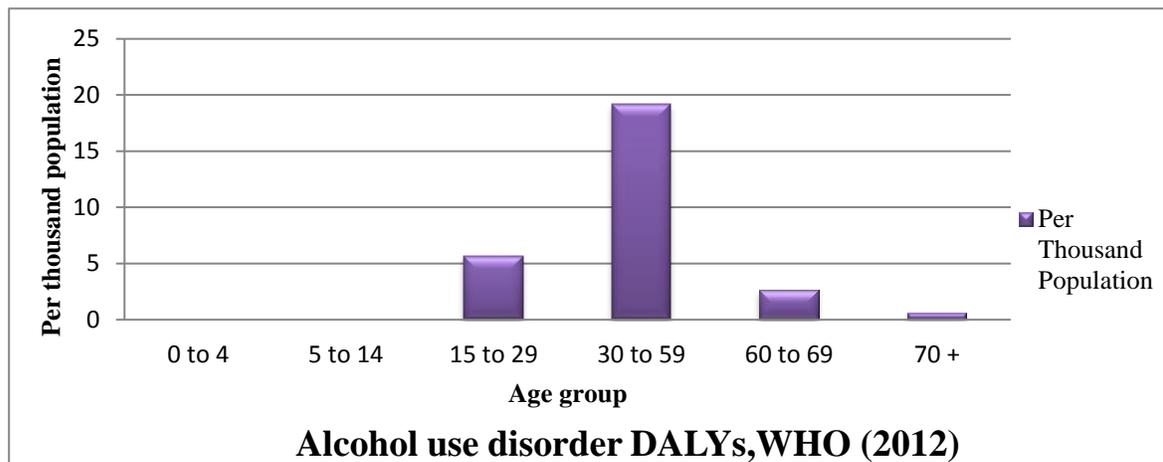


Figure 18. World Health Organization (Estonia alcohol disease burden by age group), 2012.

According to the opinion and lifestyle survey conducted in the United Kingdom (2014), it is being found that around 18% of the young generation (age ranging from age 16 to 24 years) consumes 14 units of alcohol, which is maximum among the all other age groups of the population. While other age groups such as 25 to 44, 45 to 64 and 65 and above consume 14 units of alcohol by the percentage of around 11, 8 and 3. So, it evaluated that as the age increases the percentage of alcohol consumption by 14 unit's decreases. So, this means that young generation consumes more percentage of alcohol as compared to the older generation [30] (See Figure 19).

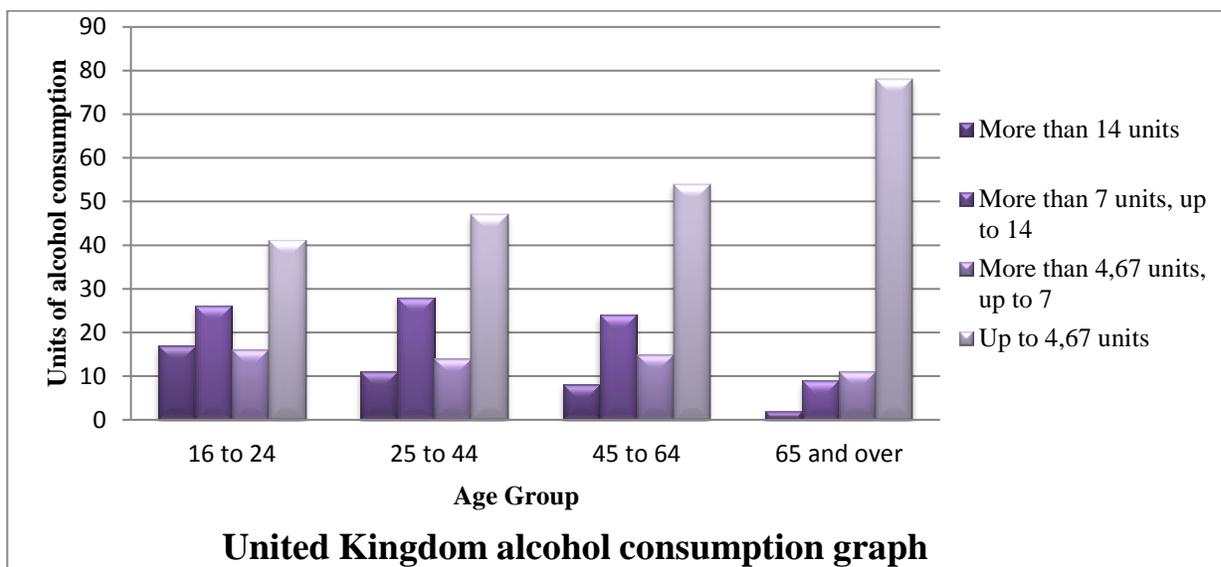


Figure 19. National office for statistics, 2014.

According to the survey conducted by Australian Institute of Health and Welfare, it was found that majority of population drink alcohol by putting themselves into the category of lifetime risk falls in between the age range from 18-24 years, who consume up to a minimum of 2 standard drinks per day. It is found maximum while compared to the other age group of people from 2001 to 2013 [31]. Similar kinds of patterns are also found in Canada and United Kingdom. According to the statistics cited by the Canadian government (2014), it is found that excessive amount of alcohol consumption is being experienced by the people from age group ranging from 20 to 34 with 2.1 million population being exposed to heavy drinking [32]. One of the studies in the United States of America finds that 59.8% of full-time students between the age group of 18-22 drank alcohol in the last month as compared to 51.5 % of other persons of same age. 37.9% of college students engaged in binge drinking in the past

month compared with 33.5 percent of other persons of the same age group of 18-22 years. College students engaged in heavy drinking contribute to 12.2 % whereas other is only 9.5% of the same age group in the past month [33].

Besides all the parameters in the world, Estonia is having the highest consumption rates with 14.97 liters of pure alcohol consumed per capita.

But among students if the alcohol consumption patterns are compared then it is evaluated that in Estonia 98.79% of the students drink alcohol which consists of students who drink alcohol on special occasions (60.9%), once in a week (10.9%), every day (15.8%) and 3-5 times in a week (10.9%). This study gives the clear indications that students are interested to know more about telemedicine if the university will provide them more information (85.36%). At present, almost 96.3% students are not using any telemedicine services but they show the positive interest in using these services in coming future. This is because of lack of awareness of the importance of telemedicine services among the students. They prefer to use these services even while travelling (97.56%) and the most convenient way to use these services are through smartphone mobile applications (31.7%) and video conferencing (29.26). Students agreed on the statement that telemedicine helps in maintaining their privacy (62.2%), saves time and money (86.58%) and it became easier for them to freely ask questions with the doctors (87.8%). Students believe that frequent consultation with the doctors helps in maintaining their good health (73.17%). 87.8% of the students agree with the statement that telemedicine is helpful in well-being in future. The number of students which thinks that telemedicine helps in minimizing mental health, reducing alcohol and drug consumption by 67%, 66% and 53.6% respectively. The study also reveals that majority of the students want to get in touch with their doctor even while travelling. This will further help in reducing the cost incurred in having medical health care services. Fewer numbers of doctors are appointed to take care of the healthcare issues Instant and 24/7 access to the medical care through healthcare mobile applications or web portal helps in reducing the time of the students, as they will not have to wait for booking the appointments dates. Access to the medical services even while travelling helps in reducing the cost incurred by the students because it gives them the freedom to access and consults their doctor from anywhere. There is no need for the students to visit doctor personally. Frequent counselling along with 24/7 availability of the doctors help in

maintaining the good health of students. Also, students can ask their questions more freely. The country needs better health care of the students because students in the coming years have greater responsibility to pay tax.

In upcoming years they have to pay more taxes if the old age population continues to increase. Shrinking young population including low fertility rates is also a point of worry and the country may have to be more careful about the health of the younger population. Increasing dependency ratio of Estonia represents that the liabilities of government and younger working population towards the dependent population of Estonia continue to be on the rising stage. It further indicates that government spending on health care, pension and other benefits will continue to increase in near future. An increase in non-productive growth of old age population tends to decrease in economic growth because of less producing capacity of the country. Increasing life expectancy ratio in Estonia indicates that the older population will tend to live longer. So, the government will have to spend more money in providing health care and pension benefits to the old aged people. Increasing social and healthcare expenditure in Estonia clearly represents that in coming future it will be a major responsibility for the young working population and government to contribute to the health care and other benefits to the youth and old age population (See Appendix-1).

## **7 Summary**

Students are interested to know more about telemedicine, so the university can conduct seminars or lectures on telemedicine to make students aware of the importance of telemedicine. In this study, the author, find out that the students are ready to adopt this new technology and agreed that it will help them for wellbeing in future. New online techniques have to be followed which includes video conferencing and mobile application which helps students to communicate with their doctor. These services have to be designed in such a manner so that these services can be easily accessible to them from anywhere around the world through internet. Majority of the students drink alcohol and also show signs and symptoms of depression in last year, so regular counselling with the doctors through telemedicine could help in maintaining good health of the students. This will further reduce the time and cost incurred by the country and consumers. Students are required to need these services, for the betterment of the country's future. Because healthy generation is the future of the country. By effectively using these survives, the healthcare expenditure on health care can be minimized. If the generation of the country is healthy, the less number of medical benefits will be given to the younger generation.

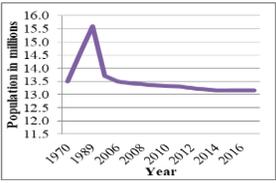
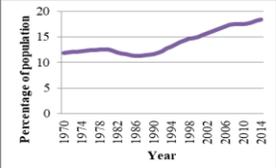
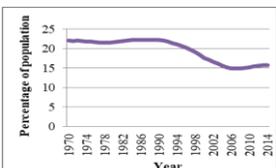
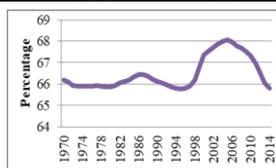
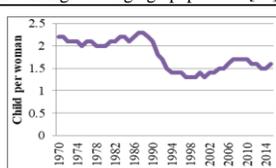
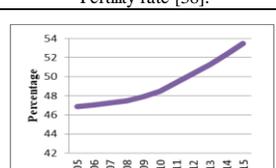
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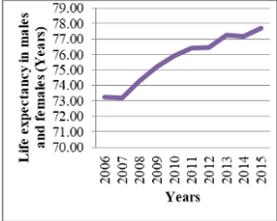
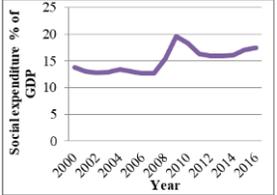
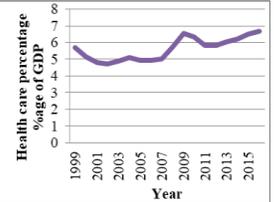
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## Appendix Factors that influence the country to implement Telemedicine among young generation/ students.

Sr. Number	Factors	Description	Trend
1	Declining population trend of Estonia	In the last 47 years, Estonia has been experiencing the overall net decrease in population from 1970 to 2017. From 1970, the population of Estonia sharply increased from 1356079 to 1565662 in the year 1989 with a population growth of 209583; this was the only time when Estonia achieved the highest number of population in the history. After 1989, the overall trend of the population is found to be in declining stage until 2017 [34].	 <p>Population trend of Estonia [34].</p>
2	Increasing old age population	The old age population is referred to the group of the population having age from 65 and over. Due to this increasing elder population in Estonia, this country will have to face a number of social and economic challenges. The government has the major responsibility for spending on pension, healthcare, education and other social benefits. The line graph indicates that the old age population of Estonia. From the year 1970 to 2014 it is found that the old age population (65 and over) is consistently increased from 11.8 % to 18.3% of the total population [35].	 <p>Increasing old age population [35].</p>
3	Young population	Youth population is the category of the population having age less than 15 years. The percentage of the youth population is decreased from 22 to 14.88 in the year 1970 to 2008. After that, approximately 1% increase in the youth population was experienced in Estonia from 2008 to 2014. But on the other hand overall youth population is found to be in the shrinking stage [36].	 <p>Young population trend [36].</p>
4	Declining working age population	The working-age population is referred as those people having age ranging from 15- 64. In the year 1970 it was 66% of the population and goes up to 67 % in the year 2010, and after this, it again fell down rapidly to 65% by the year 2014 [37].	 <p>Declining working age population [37].</p>
5	Fertility rate	For a stable population, the country fertility rate must be 2.1 children per woman. In Estonia, over several years the fertility rates are found to be on declining stage. In the year 1970, the fertility rate in Estonia was found to be very decent as 2.1 and that rate was the good indicator of stable population. But as the time passed this rate tends to fall over the several years and in 2015 it was recorded this rate as 1.5 children per woman [38].	 <p>Fertility rate [38].</p>
6	Dependency ratio	Age dependency ratio is the ratio of the dependent population of age ranging from 0-15 or 64 years and over to those of working age population. Most of the Western world is experiencing the higher age dependency ratio because the population is living longer. Or in other words, the old age population tends to live longer which further increases the dependency ratio. The above-mentioned graphs represent the age dependency ratio of Estonia. From the graph, it is extracted that this age dependency ratio is concisely increasing in Estonia. [39], [40]	 <p>Dependency ratio [39],[40].</p>

7	Life expectancy increased	Based on the year of birth Life expectancy is the average expected time of the person to live. This major change in life expectancy one of the greatest achievement in the twentieth century. Most of the Western countries had experienced higher life expectancy in past 50 years. In Estonia, the life expectancy of both male and females are increasing consistently from 73.22 years in the year 2006 to 77.71 years in 2015 [41].	 <p>Life expectancy increased [41].</p>
8	Social expenditure	Social expenditure is the expenditure which refers to the cash benefits, benefits in terms of goods or services. These social benefits are entitled to the elderly, disabled, sick, unemployed or young population. The social spending in Estonia is found to be growing from 2000 to 2016. In the year 2000, the social expenditure was 13.8 % of GDP and it increases further to 17.4% in the year 2016 [42], (43).	 <p>Social expenditure [42],[43].</p>
9	Health expenditure	Health expenditure refers to the expenses incurred in providing health care goods or services such as curative care, rehabilitation care, long-term care, medical goods, and prevention and public health services. It excludes spending on investment. In Estonia, the expenditure on health care is being increased from 5.7 to 6.6 % of GDP from the year 1999 to 2015 [44], [45].	 <p>Health expenditure [44],[45].</p>