



UNIVERSIDADE DA BEIRA INTERIOR
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Awareness, perception and usage of mobile applications for health and wellness

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"Vem por aqui" – dizem-me alguns com os olhos doces
Estendendo-me os braços, e seguros
De que seria bom que eu os ouvisse
Quando me dizem: "vem por aqui!"
Eu olho-os com olhos lassos,
(Há, nos olhos meus, ironias e cansaços)
E cruzo os braços,
E nunca vou por ali...
A minha glória é esta:
Criar desumanidades!
Não acompanhar ninguém.
– Que eu vivo com o mesmo sem-vontade
Com que rasguei o ventre à minha mãe
Não, não vou por aí! Só vou por onde
Me levam meus próprios passos...
Se ao que busco saber nenhum de vós responde
Por que me repetis: "vem por aqui!"?

José Régio - Cântico Negro

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Resumo Alargado

Introdução: Hoje em dia os serviços de saúde enfrentam um grande desafio devido à falta de pessoal e a difícil acessibilidade. Para preencher essa lacuna é necessário o envolvimento do paciente de forma a gerir a sua doença para que tratamentos mais dispendiosos não sejam necessários. Com o desenvolvimento dos smartphones e disponibilidade de rede sem fios, existe a possibilidade de as plataformas móveis se tornarem um veículo de prestação de cuidados de saúde.

mHealth ou saúde móvel foi definida pelo *Global Observatory for eHealth* como a prática médica com o auxílio de dispositivos móveis. Estes aplicativos são vistos como ferramentas muito úteis na prevenção e gestão das principais causas de mortalidade. Como o *empowerment* dos pacientes é fulcral para que os serviços de saúde cheguem à maioria da população, as aplicações mHealth (mHealth apps) devem ser posicionadas como uma das principais plataformas de prestação de cuidados de saúde.

O objetivo deste estudo é avaliar o conhecimento, percepção e uso relatado de mHealth apps nos estudantes de medicina em Portugal e numa amostra de conveniência de cidadãos portugueses.

Metodologia: Este estudo tem uma metodologia quantitativa. O seu foco de estudo foi a população de estudantes de medicina de cada escola médica portuguesa e os habitantes portugueses. A colheita de dados foi feita através de um questionário.

Resultados: Foram obtidas 528 respostas válidas a partir de estudantes de medicina e 301 de habitantes portugueses.

Na amostra de estudantes de medicina, 65,6% (n = 258) alegou que sabia o que era uma mHealth app e 88,4% afirmaram que conheciam pelo menos uma mHealth app. Na amostra da população portuguesa, 62,9% (n = 159) alegou que sabia o que era uma mHealth app e 74,2% afirmaram que conheciam pelo menos uma mHealth app. As mHealth apps mais conhecidas foram sobre o exercício físico - 86,0% em estudantes de medicina e 87,1% na população portuguesa.

79,4% (n = 181) da amostra de estudantes de medicina e 78,8% (n = 93) da amostra da população portuguesa já utilizou alguma mHealth app. A frequência de utilização das mHealth apps foi elevada em ambas as amostras, com 64,9% de utilizadores frequentes (usando pelo menos 3 vezes por semana) na amostra de estudantes de medicina e 69,9% na amostra da população portuguesa. Dividindo as mHealth apps nas principais causas de morte,

é verificado que 39,2% (n = 71) da amostra dos estudantes de medicina e 24,4% (n = 20) da amostra da população portuguesa utilizavam este subgrupo de mHealth apps.

Foi encontrada significância estatística entre "ser estudante de medicina" e a percepção de mHealth apps (p = 0,001) e entre o primeiro e a utilização de mHealth apps sobre as principais causas de morte (p = 0,019). A associação entre faixa etária e percepção de mHealth apps também foi estatisticamente significativa (p = 0,030). Também foi encontrada uma tendência para a significância estatística entre o nível de educação e a percepção de mHealth apps (p = 0,065) e entre a faixa etária e o uso de mHealth apps (p = 0,053).

Discussão: As apps são uma ferramenta com muitas potencialidades, pouca necessidade de investimento monetário ou de ensinar como utilizar. O fator mais importante para a sua utilização é o dispositivo móvel. Por agora, o principal motor do desenvolvimento das mHealth apps são empresas privadas o que pode ter levado a que as apps sobre exercício físico fossem as mHealth apps mais populares (conhecidas e utilizadas). Não se pode excluir a possibilidade da utilização das mHealth apps nas escolas médicas. Como a maioria do trabalho feito está no campo comercial, os criadores concentraram-se em doenças típicas dos países desenvolvidos. Assim, as doenças cardíacas são das mais estudadas e com mais aplicativos juntamente com VIH/SIDA.

A percepção pode ser influenciada por outros fatores como interação com o meio, colegas, poder de compra e predisposição para este tipo de tecnologia. Quase todos os que conhecem e têm alguma percepção das mHealth apps acabam por usa-las. Apesar da elevada aceitação das novas tecnologias entre os grupos etários mais jovens, o fator monetário apenas é superado no grupo etário [23; 28]. A partir do ponto que adquirem o smartphone as pessoas tendem a mantê-lo o tempo todo com elas levando a um grande numero de utilizadores frequentes.

Muito poucas pessoas usam mHealth apps sobre as principais causas de morte. A grande discrepância entre o uso de mHealth apps e o uso deste subconjunto de mHealth apps levanta a possibilidade de o questionário não ter sido claro e/ou o inquirido não estar familiarizado com a expressão. Esta possibilidade também é suportada pela literatura pois existe uma elevada aceitação e difusão de programas de saúde baseados em mHealth apps.

Conclusão: Há um alto nível de conhecimento, percepção, utilização e frequência de utilização das mHealth apps sendo o smartphone o elemento chave para a utilização destas ferramentas. As mHealth apps parecem ter uma aplicabilidade no Sistema Nacional de Saúde, contudo novos estudos são necessários para aferir se essa possibilidade é custo-efectiva. Por outro lado, esta tecnologia pode ser uma potencial plataforma de ensino nas escolas de médicas.

Parece que os grupos etários mais velhos têm alguma relutância em usar apps. Possivelmente a adaptação das apps existentes à faixa etária ou a utilização com apoio pode dissolver essa relutância.

Foi encontrada uma queda entre o uso de mHealth apps e mHealth apps sobre as principais causas de morte. Esta informação abre uma janela de intervenção para o sistema nacional de saúde de forma a aumentar a utilização deste subconjunto de mHealth apps. Mais estudos são necessários para desvendar a verdadeira natureza desta variável.

Palavras-Chave

mHealth; app; estudante de medicina; cidadão; smartphones.

Abstract

Introduction: Nowadays, health services face great challenge due to lack of staff and difficult accessibility. To fill this gap is necessary the patient involvement through the managing of his disease to not need more expensive treatments. With the development of smartphones and availability of wireless network, there is a possibility of mobile platforms to become a health care delivery vehicle.

mHealth or mobile health was defined by Global Observatory for eHealth as a medical practice supported by mobile devices. These applications are seen as very useful tools in the prevention and management of the main mortality causes. As the empowerment of patients is a key element so that health services reach the majority of the population, mHealth applications (mHealth apps) should be positioned as one of the main health care delivery platforms.

The purpose of this study is evaluate the awareness, perception and reported use of mHealth apps in the medical students in Portugal and in a convenience sample of portuguese citizens.

Methodology: This study is a quantitative methodology. The focus of study was the population of medical students of portuguese medical schools and the portuguese population. Data collection was done through a questionnaire.

Results: It was obtain 528 valid responses from medical students and 301 of the Portuguese citizens.

In the sample of medical students, 65,6% (n=258) claimed that knew what was a mHealth app and 88,4% said they knew at least one mHealth app. In the sample of the portuguese population 62,9% (n=159) claimed that knew what was a mHealth app and 74,2% said they knew at least one mHealth app. The best known mHealth apps were about physical exercise - 86,0% in the medical students and 87,1% in the portuguese population.

79,4% (n=181) of the sample of medical students and 78,8% (n=93) of the sample of the portuguese population has used some mHealth app. The frequency of use of mHealth apps was high in both sample, with 64,9% of high frequent users (using at least three times per week) in the sample of medical students and 69,9% in the sample of the portuguese population. Dividing the mHealth apps on leading causes of death, it is found that, 39,2% (n=71) of the sample of medical students and 24,4% (n=20) of the sample of the portuguese population were using this subset of mHealth apps.

Statistical significance was found between "being a medical student" and perception of mHealth apps ($p=0,001$) and the use of mHealth apps on the main causes of death ($p=0,019$). The association between age and mHealth apps perception was also statistically significant ($p=0,030$). A trend toward statistical significance between the level of education and the perception of mHealth apps ($p=0.065$) and between the age group and the use of mHealth apps ($p=0.053$) was also found.

Discussion: The apps are a tool with great potential, little need for monetary investment or to teach how to use and the most important factor for its use is the mobile device. For now, the main engines of development of mHealth apps are private companies which may have led to the apps on exercise being the most popular mHealth apps (known and used). One can not exclude the possibility of using these apps in medical schools. As most of the work is done in the commercial field, the developers have focused on diseases typical of developed countries. Thus, the heart disease is one of the most studied and with more applications with HIV/AIDS.

The perception may be influenced by other factors such as interaction with the environment, peers, purchasing power and predisposition for this type of technology. Almost all of those who know and have some perception of mHealth apps use them. Despite the high acceptance of new technologies among younger age groups, the monetary factor is only surpassed in age group [23; 28]. From the point that smartphone is acquired people tend to keep it all the time with them leading to a large number of high frequent users.

Very few people use mHealth apps of the main causes of death. The large discrepancy between the use of mHealth apps and the use of this subset of mHealth apps raises the possibility that the questionnaire was not clear and/or the respondent was not familiar with the term. This possibility is also supported by the literature as there is a high acceptance and dissemination of health programs based on mHealth apps.

Conclusion: There is a high level of awareness, perception, use and frequency of use of mHealth apps being the smartphone the key to use these tools. The mHealth apps seem to have applicability in the National Health System, but further studies are needed to assess if this option is cost-effective. Moreover, this technology can be a potential teaching platform in medical schools.

It seems that the older age groups have some reluctance to use apps. Possibly the adaptation of existing apps to age group or use with support can dissolve this reluctance.

A break between the use of mHealth apps and mHealth apps of the main causes of death was found. This information opens a window of intervention to the national health system in order

to increase the use of this subset of mHealth apps. More studies are needed to uncover the true nature of this variable.

Keywords

mHealth; app; medical students; citizens; smartphones.

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Index of Acronyms

AIDS	Acquired immunodeficiency syndrome
App	Mobile application
e-mail	Electronic mail
FMUC	Faculdade de Medicina da Universidade de Coimbra
FMUL	Faculdade de Medicina da Universidade de Lisboa
FMUP	Faculdade de Medicina da Universidade do Porto
GOe	Global Observatory for eHealth
GPS	Global Positioning System
GSMA	Groupe Speciale Mobile Association
HIV	Human Immunodeficiency Virus
ICBAS	Instituto de Ciências Biomédicas Abel Salazar
ICT	Information and Communications Technology
iPod	Portable media player designed and marketed by Apple Inc.
ITU	International Telecommunication Union
mHealth	Mobile health
NMS-FCM	NOVA Medical School - Faculdade de Ciências Médicas
PDA	Personal Digital Assistant
PwC	Price Waterhouse and Coopers & Lybrand
UALg-DCBM	Universidade do Algarve - Departamento de Ciências Biomédicas e Medicina
UBI-FCS	Universidade da Beira Interior - Faculdade de Ciências da Saúde
UM-ECS	Universidade do Minho - Escola de Ciências da Saúde
UN	United Nations
WHO	World Health Organization

Introduction

In the 21st century, healthcare continues to be a challenge, not only because of the costs but also due of the lack of staff and difficult access. The current rate of medical training only supplies four physicians for every 1000 patients worldwide (1). In developed countries, with the ageing population and sedentary life style, the impact of chronic diseases is growing every day, overloading the healthcare systems. On the other hand, in the developing countries, access to the healthcare continues to be a challenge (2).

Given such a disparity between the offer and demand, and the limited response capacity of health services, there is the risk of increasing undiagnosed diseases and also poorly controlled chronic diseases like diabetes (3). In order to fill this gap, self-management has become one of the main concerns of health authorities and providers. Patient engagement in the disease management it has the potential to provide the necessary care and decrease the demand for expensive treatment (1).

In contrast to the healthcare access, the mobile access is becoming almost world wide spread. According to the International Telecommunication Union (ITU) there are approximately 5 billion mobile phone subscriptions in the world, with over 85% of the world's population covered by a commercial wireless signal and over 70% of them residing in low and middle income countries (4).

Through the development of smartphones and the availability of wireless signal almost everywhere, the stage is set for the development of mobile platforms as vehicle of healthcare services. The Global Observatory for eHealth (GOe) named mHealth or mobile health to the medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices (4).

According to the report from GSMA/PwC, about 50% of mobile phone and tablet users will have downloaded mHealth applications (mHealth apps) within five years (2). The potential for mHealth apps is rather well-documented (5-7) and they are seen as very useful tools in the prevention and management of the leading mortality causes (8).

Since nowadays empowerment is considered a new tool to bring health services to the majority of the population, we must position mHealth as one of the main platforms to provide this new paradigm of ubiquitous health care.

The aim of this work is assess the knowledge, perception and reported use of mHealth apps in two subpopulations - students of medicine in Portugal and a convenience sample of the

portuguese citizens - for the leading causes of death in Portugal. These two subpopulations were chosen because the medical students are the physicians of tomorrow so, certainly, they will need this technology to provide a good healthcare service; on the other hand, the general population is the end user of this kind of product and if there is no awareness or a low rate of use the benefit of this technology will be limited. The specific objectives of this study were:

- a) To explore the level of awareness and usage of mHealth apps in medical students population and general population, and;
- b) To investigate the relationship between awareness, perception and usage of mHealth apps in general and for looking up information about the main causes of mortality and the following variables:
 - a. Age, level of education;
 - b. being a medical student;

Considering the proposed objectives, the following hypotheses were established:

Hypothesis 1: There is a relationship between level of education and the contact with mobile applications for health and well-being.

Hypothesis 2: There is a relationship between being a medical student and the contact with mobile applications for health and well-being.

Hypothesis 3: There is a relationship between age group and the contact with mobile applications for health and well-being.

Methodology

1. Type of study

This study uses a mostly quantitative methodology. The intention is to collect and process the data in a systematic fashion, while also statistically establishing relationships between variables to address the hypotheses of this thesis. The data were collected in a single moment. This constituted a cross-sectional study.

2. Study population

This work focused in two different sets of populations. One population was the estimated universe of 7520 medical students of every portuguese medical school. Per year, it is estimated that there are 970 new medical students and the total of students in each moment, assuming that each course are six years (except in UAlg-DCBM which is four years), estimated to be 7520. The other was the universe of 10.562.178 portuguese inhabitants¹.

The total sample of medical students was constituted of 528 (380 female). The representativeness by gender would imply the verification student-to-student so it was not made. However, by empirical finding of the great proportion of female students, it was considered that the sample is a trustworthy representation of the population.

The total sample of Portuguese inhabitants was constituted of 301 (157 female). The gender, age and level of education of Portuguese population it not aim to be fully representative of the Portuguese Population but rather a subsample of active population, as it can be seen through empirical finding.

3. Questionnaire

The data collection was made through an anonym and auto-reply questionnaire (Annex A and B), that was built for that purpose with four parts:

- Sociodemographic data;
- Contact with mobile devices;
- Contact with apps;

¹ INE, Censos 2011

- Contact with mHealth apps;
 - Non-users of mHealth apps;
 - Users of mHealth apps.

Some information about mobile operative systems used by the responders were gathered, however, as it was not immediately useful in this study, it was not displayed in the results section.

4. Data collection method

The survey was sent to the mailing list of every medical student through collaboration of administrative systems of each college and was available between the 7th of January and 1st of March, 2014.

Regarding the distribution of questionnaire in the Portuguese population, the social network Facebook® was used to obtain a convenience sample during the same time interval of the medical students' population.

The timing for the application of the survey was defined taking into account the school calendar in order to avoid the evaluation periods while not delaying the study.

The questionnaire was built in the Google forms allowing the criterion of anonymity (it was not possible to connect the answers to who answered). This platform also allowed the questionnaire to be filled only once and the inability to access the questionnaire by anyone outside the database.

5. Variables

In this study, the dependent variables were: knowing what is a mHealth app, knowing at least one mHealth app, use of mHealth app, groups of mHealth apps used, frequency of use of mHealth apps, use of mHealth apps categorized in one of the main causes of death on Portugal.

The independent variables were: age, gender and being a medical student; in the sample of medical students, the year and college one attended; in the sample of Portuguese population was also level of education, profession and living in Portugal.

6. Analysis procedure

The data analysis was made as shown in the scheme of the annex C.

The analysis of the data was made with the software Statistical Package for the Social Sciences® version 22.0.

A first approach was made with descriptive statistical analysis of the variables and an exploratory analysis of the continuous variables (mean and standard deviation) as well as analysis of the categorical variable frequencies. The variable's distribution was analyzed graphically through bar charts.

The second approach of the analysis corresponded to the inferential study of the data through non-parametric tests, with the objective of assessing the relation between the variables and check if there are significant differences between the studied subpopulations. In this phase bar charts were also used to analyze the behavior of some variables between the study groups'.

To assess the relation between categorical variables, the chi square test was used. The chi square test of independence allows analyze the relationship independence between qualitative variables - this test reports the relationship independence, but don't report the degree of association.

The null hypothesis of the tests of independence considers that the variables analyzed are independent for a significance level of 5%. Thereby, if the obtained p value is higher than 0,05 ($p \geq 0,05$) the differences between the obtained values and the expected values are considered not significant and, therefore, the variables do not correlate.

However, the chi square test presupposes that no table cell has an expected frequency lower than 1 and that no more than 20% of table cells has an expected frequency lower that 5 units. If that happens the Fisher's exact test is used with the same null hypothesis as the chi square test (9).

The graphs were made in the Microsoft® Excel® 2010.

Results

1. Descriptive statistics

1.1. Student population

From the pool of responses obtained from medical students, four had less than eighteen years of age, and one did not have a cellphone. These were excluded from this study.

From the estimated universe of 7520 medical students from Portuguese medical schools, 528 valid responses were obtained. This is a sample size of 7,02%, from these, 380 (71,97%) were female.

The average age was $21,50 \pm 0,147$ years and the age distribution can be seen in the chart below.

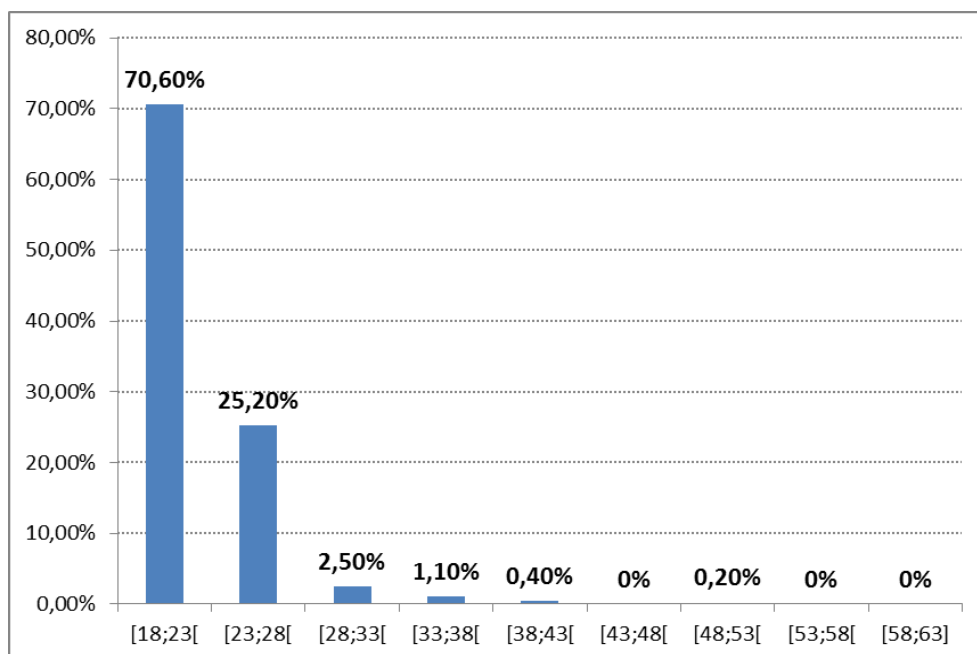


Figure 1 - age distribution in medical students' sample

The average adherence of each medical school can be seen in the graph.

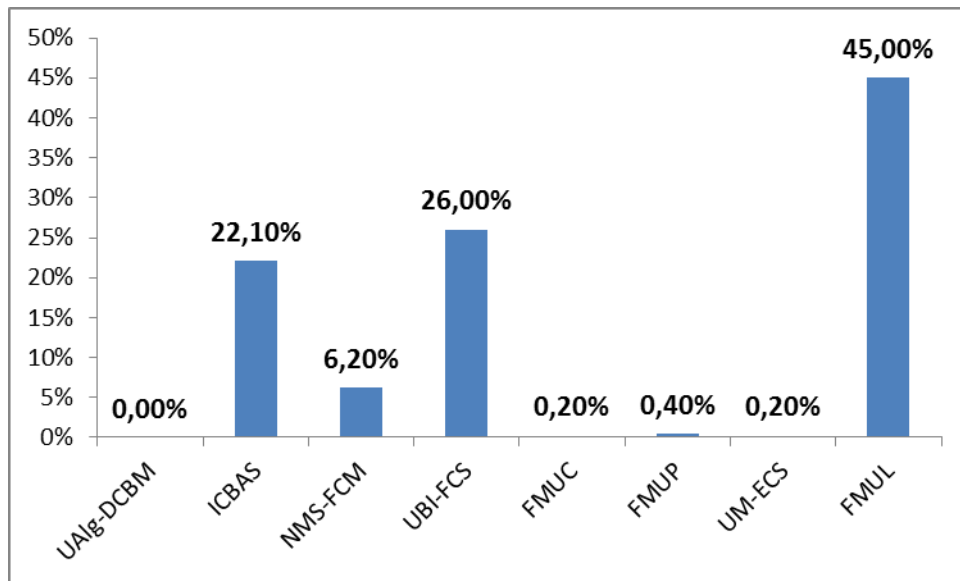


Figure 2 - college distribution in medical students' sample

FMUC - Faculdade de Medicina da Universidade de Coimbra; FMUL - Faculdade de Medicina da Universidade de Lisboa; FMUP - Faculdade de Medicina da Universidade do Porto; ICBAS - Instituto de Ciências Biomédicas Abel Salazar; NMS-FCM - NOVA Medical School - Faculdade de Ciências Médicas; UAIG-DCBM - Universidade do Algarve - Departamento de Ciências Biomédicas e Medicina; UBI-FCS - Universidade da Beira Interior - Faculdade de Ciências da Saúde; UM-ECS - Universidade do Minho - Escola de Ciências da Saúde

The number of responses per year was roughly equal.

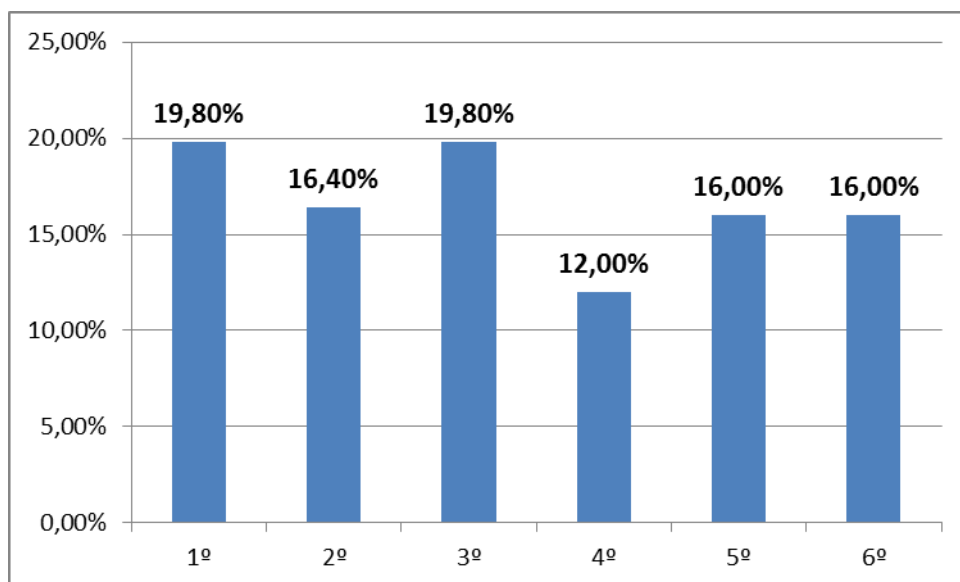


Figure 3 - year distribution in medical students' sample

As to other mobile devices except cellphone, 96,9% uses laptop too as can be seen in the graph.

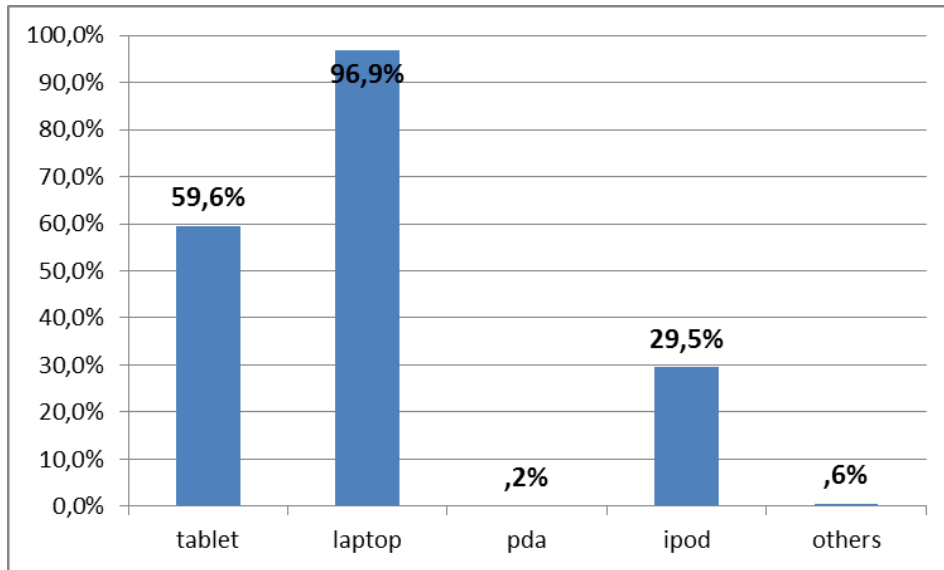


Figure 4 - mobile devices usage except cellphone in medical students' sample

From the initial sample, 417 (79%) had smartphone constituting the subpopulation in which will focus this study. In this sample 21% never used a Smartphone, 94,2% claimed to know what an app was.

Additional results will focus on the set respondents that claim to know what an app is. In this new group, 99,2% knew someone that uses apps. Most part of these people (92,1%) had a daily use of apps and 6,9% uses 2 to 3 times a week.

Of those that know what an app is, 94,9% already used an app. From these, the majority (82,8%) were using apps daily.

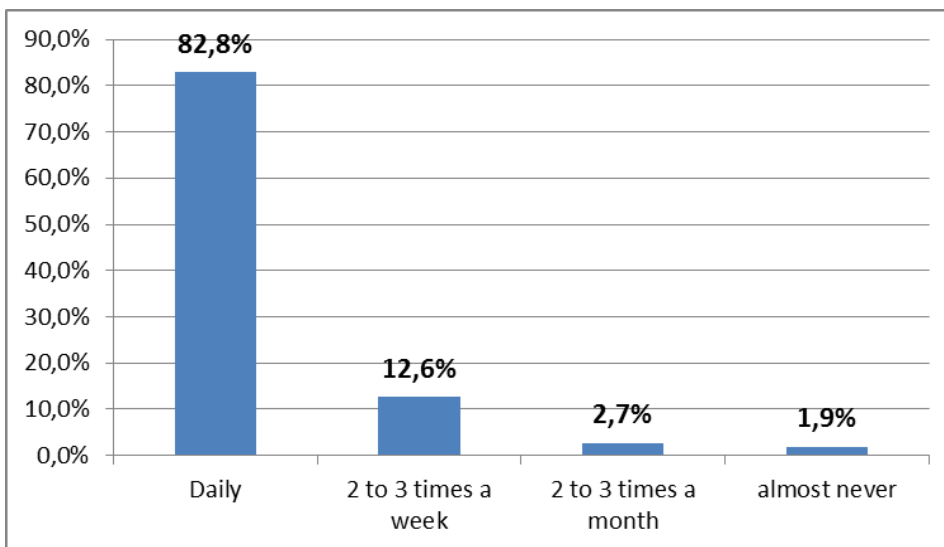


Figure 5 - frequency of usage of apps by the medical students' sample

Table 1 and 2 show results of answers to the open response:

Table 1 - thematic analysis of the open response question of the time of use of apps of the medical students' sample

Time	Number of responses
Less than 1 year	17
Less than 2 year	26
Less than 3 year	18
Less than 4 year	14
Less than 5 year	10
Less than 6 year	8
Less than 10 year	4
More than 10 years	4
Total of valid responses	101

Table 2 - thematic analysis of the open response question of the apps already used of the medical students' sample

Apps' category	Number of responses
Social network	272
Entertainment	130
Communication	122
Games	86
Medicine's information and games	86
E-mail	57
Office apps and organizers	49
Public transport	38
Virtual drives	32
Maps / GPS	30
Total of valid answers	1199

In the group of apps' users, 258 (65,6%) claimed to know what was a mHealth app.

From this point on, it will be considered only those that knew what a mHealth app was. In this subpopulation, 88,4% claimed to know at least one mHealth app.

From this point on, it will be considered only those that knew at least one mHealth app. The mHealth app with the best known theme was about physical exercise (86,0%).

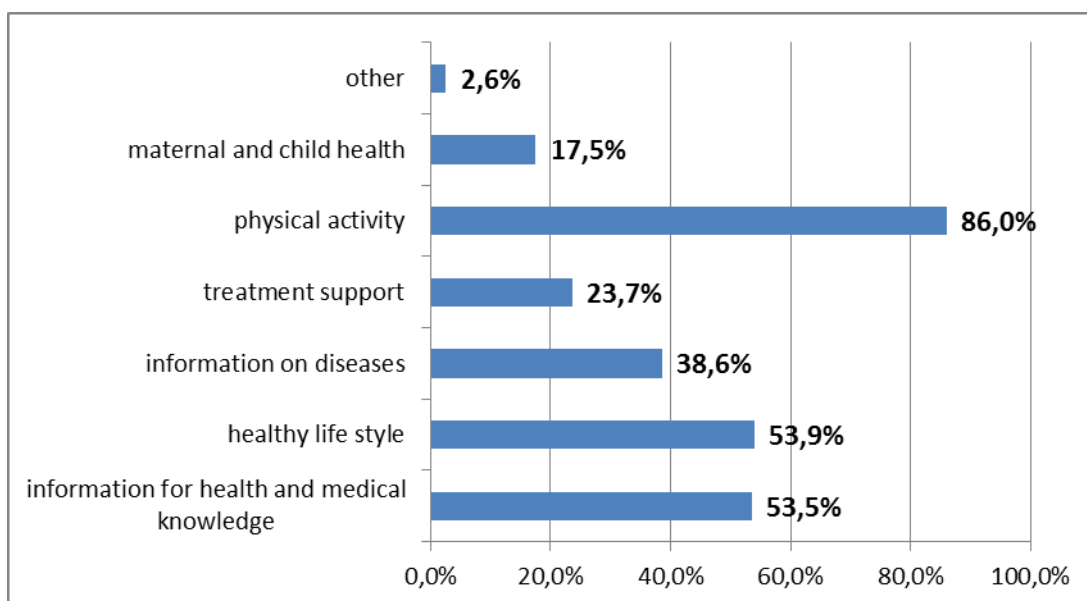


Figure 6 - perception of mHealth apps in medical students' sample

The analysis of the answers to the open response question “mHealth apps that knows” can be seen in the following table.

Table 3 - thematic analysis of the open response question of the known mHealth apps of the medical students' sample

mHealth apps' category	Number of responses
Physical exercise	80
Support of diagnosis and treatment	77
Healthy life style	25
Vital signs	7
Medical guidelines	6
Articles search	6
Therapeutic records	5
Healthy sleep habits	4
Medications reminders	3
Medical dictionary	3
Total of valid responses	250

The most common way in which it entered in contact with the mHealth apps was through research in the applications stores (75,4%) and the less common way was through medical advice.

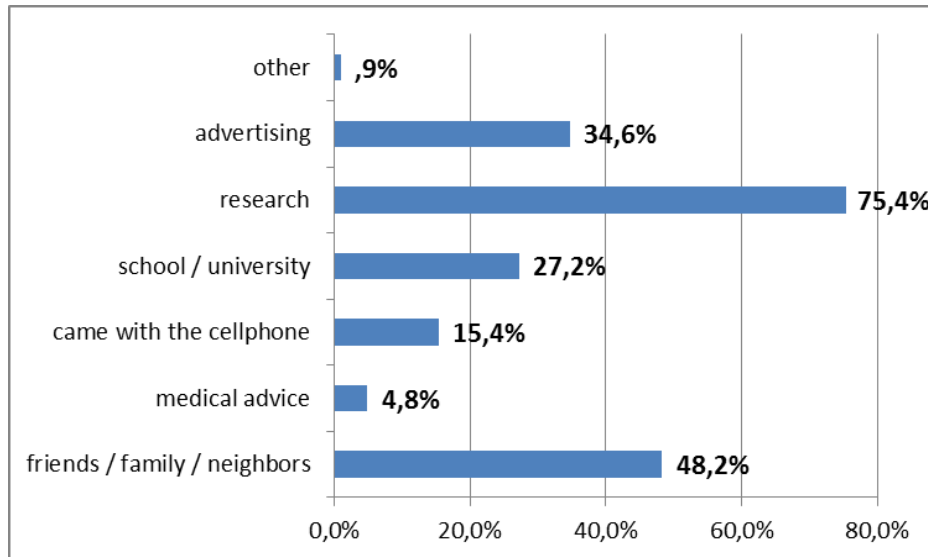


Figure 7 - forms to contact with mHealth apps in the medical students' sample

From this population with perception of mHealth apps, 181 (79,4%) already used some mHealth apps. With this response it was created two subpopulations, one with those that already used mHealth apps that we defined as users of mHealth apps and another with those that never used that we defined as non-users of mHealth apps.

Non-users of mHealth apps

The main reason why this sample had not used mHealth apps was not feeling the need to use it (69,6%).

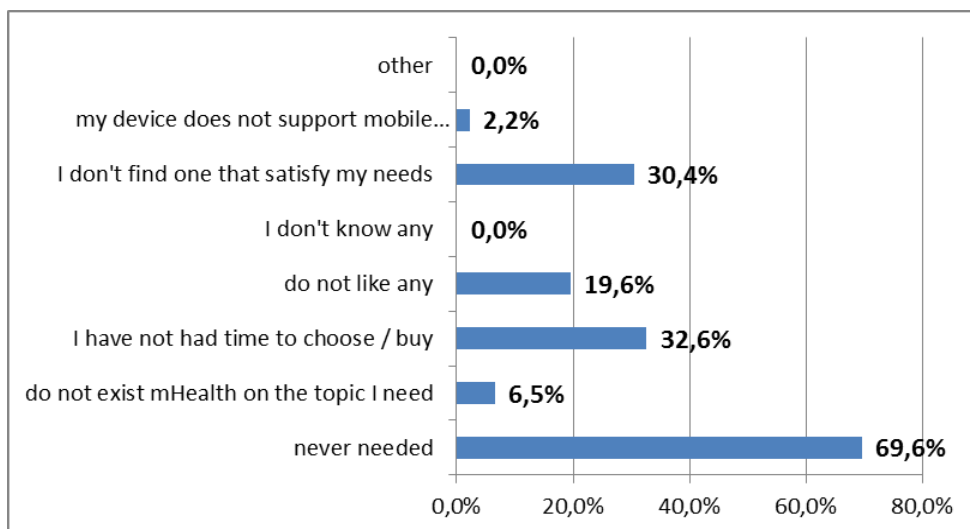


Figure 8 - reasons to not use mHealth apps in non-users of mHealth apps group in medical students' sample

When given the opportunity to try out the mHealth apps, the most desired topics were physical exercise and healthy life style (both with 50%).

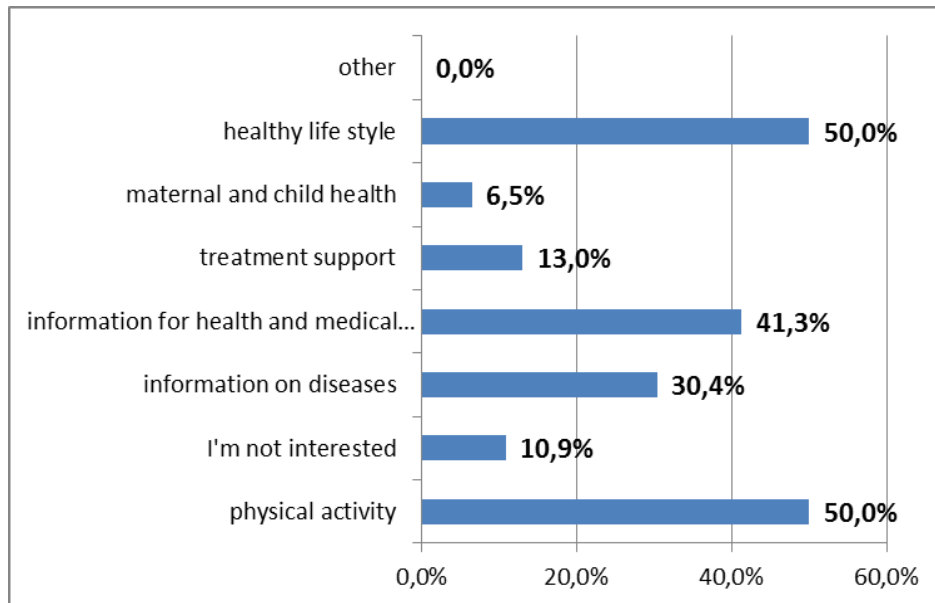


Figure 9 - desired mHealth apps by non-users of mHealth apps group in medical students' sample

Users of mHealth apps

The majority of this sample was introduced to the mHealth apps through themselves (98,3%).

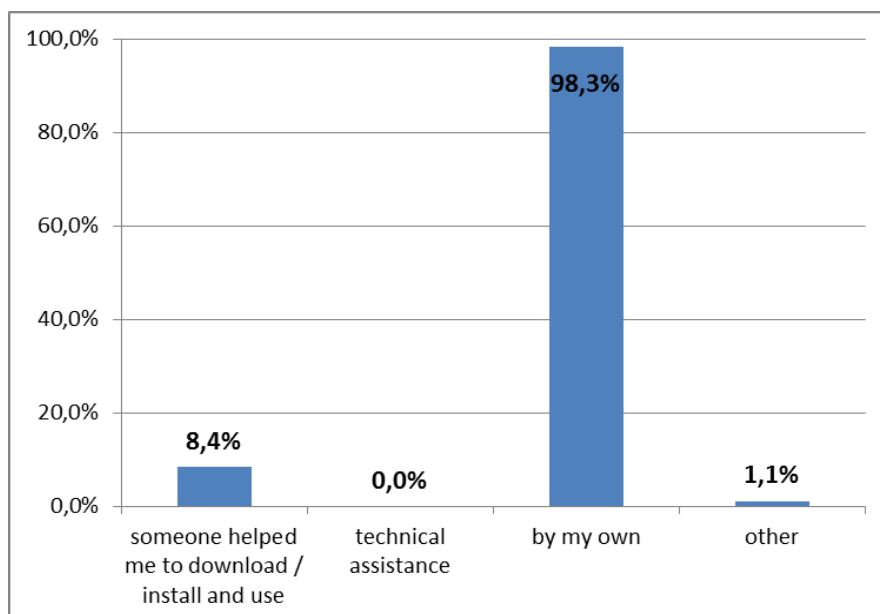


Figure 10 - ways of introduction to mHealth apps in users of mHealth apps group in medical students' sample

The analysis of the answers to the open response question “mHealth apps that already used” can be seen in the following table.

Table 4 - thematic analysis of the open response question of the mHealth apps already used of the medical students’ sample

mHealth apps’ category	Number of responses
Physical exercise	49
Support of diagnosis and treatment	47
Healthy life style	13
Medical games	7
Scientific journals	5
Vital signs	5
Medical guidelines	4
Women’s health	4
Therapeutic records	4
Medical books	3
Total of valid responses	158

The most used mHealth app was about physical exercise (79,4%).

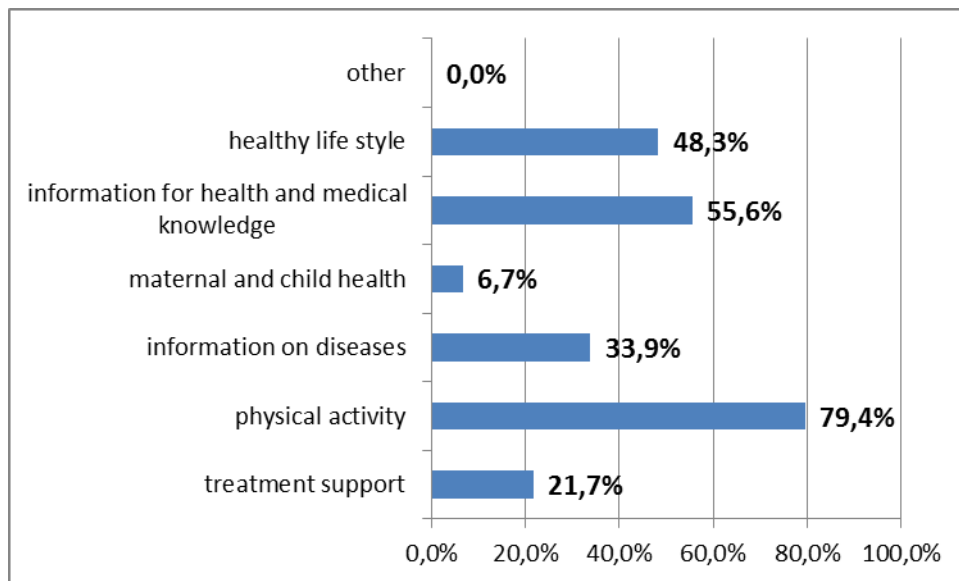


Figure 11 - usage of mHealth apps by theme in medical students’ sample

The main reason to use mHealth apps was to support physical exercise (65%), curiosity (66,1%) and the less frequent reason was medical advice (12,4%).

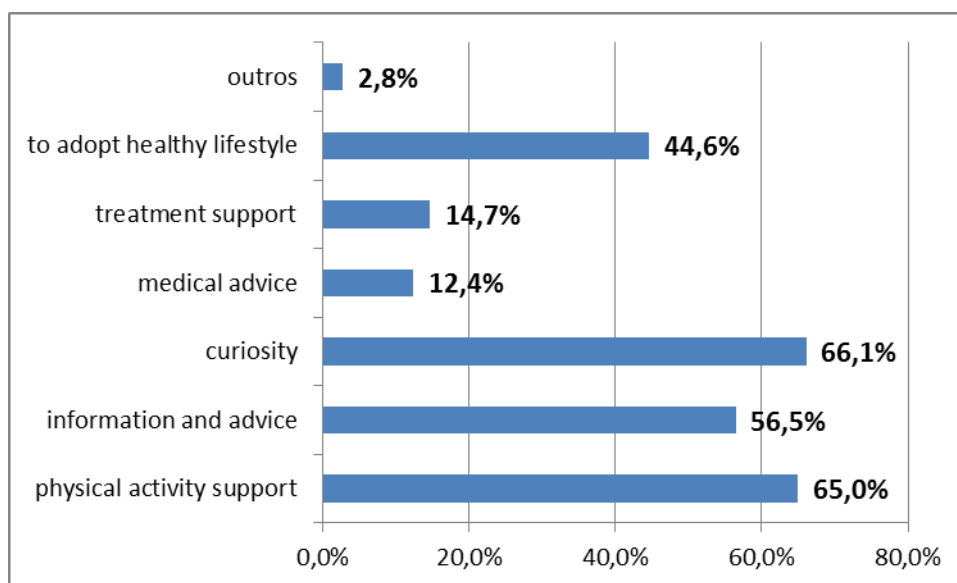


Figure 12 - reasons to use mHealth apps in medical students' sample

The analysis of the answers to the open response question “how long was using mHealth apps” can be seen in the following table.

Table 5 - thematic analysis of the open response question of the time of use of mHealth apps of the medical students' sample

Time	Number of responses
Less than 1 year	33
Less than 2 year	57
Less than 3 year	29
Less than 4 year	15
Less than 5 year	8
Less than 6 year	3
More than 6 year	4
No longer uses	1
Total of valid responses	150

The majority of the sample (36,5%) used the mobile applications two to three times a week.

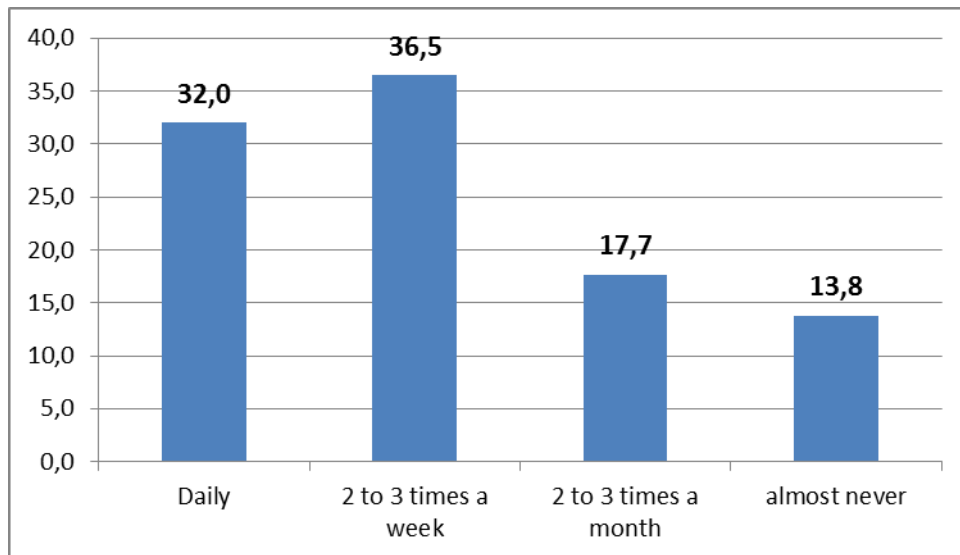


Figure 13 - frequency of usage of mHealth apps by the medical students' sample

Dividing the mHealth apps in the ten leading death causes we see that 39,2% (n=71) was using this subgroup of mHealth apps and the theme with most used apps was ischemic heart disease (74,6%).

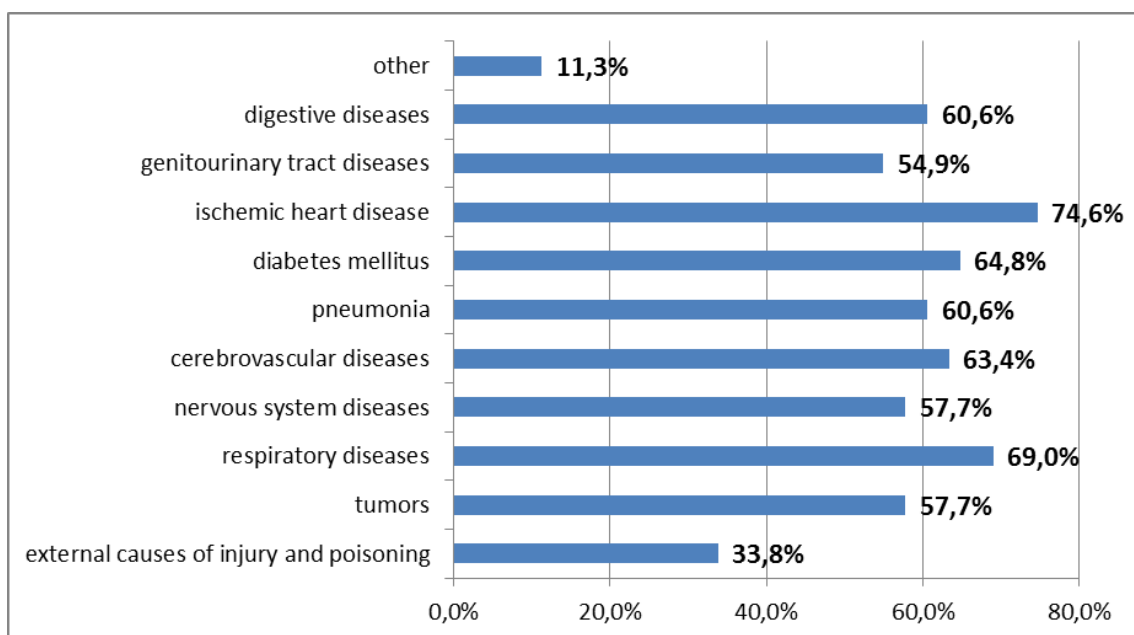


Figure 14 - usage of mHealth apps by leading death causes in medical students' sample

1.2. Portuguese population

From the pool of responses obtained, nine had less than eighteen years, sixteen lived outside Portugal and three did not have a cellphone therefore were excluded from this study.

Through a convenience sample were obtained 301 valid responses.

In the table below it can be seen the gender distribution in this sample and in the Portuguese population¹.

Table 6 - gender distribution in the sample and Portuguese population

	Sample	Portuguese population
Male	47,8%	47,8%
Female	52,2%	52,2%

The average age of the sample was 29,53 ± 0,673 years. In the graph below is shown the age distribution of the sample and the corresponding age groups of the Portuguese population¹.

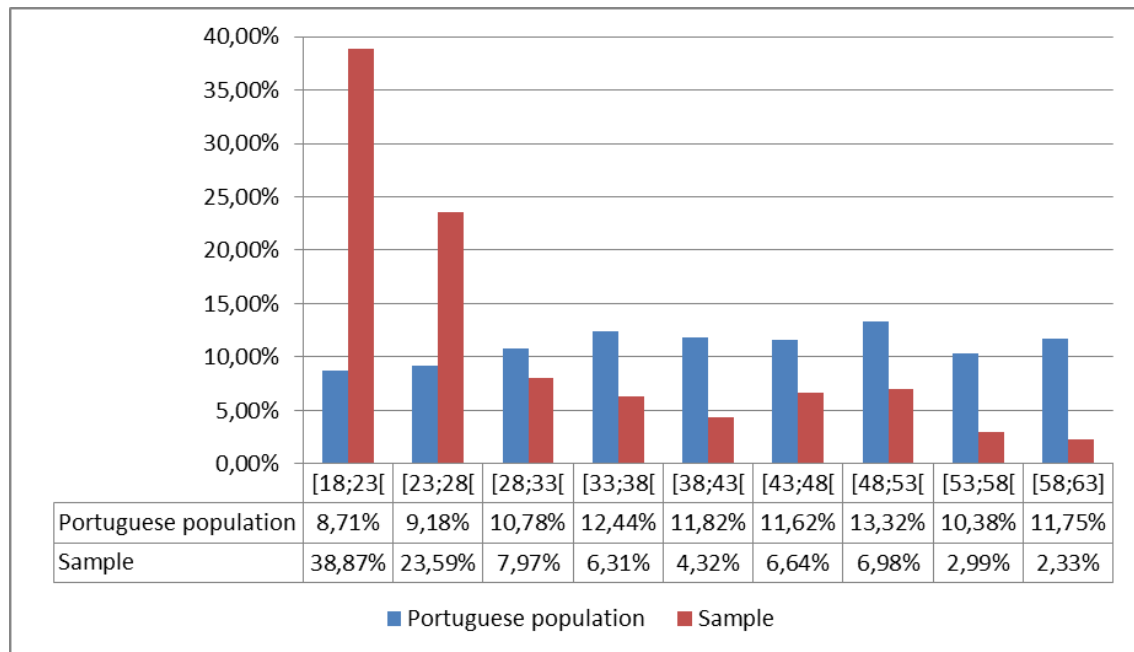


Figure 15 - age distribution in the sample and in the portuguese population

In the table below it can be seen the level of education in this sample and in the Portuguese population¹.

¹ INE, Censos 2011

Table 7 - gender distribution in the sample and Portuguese population

	Sample	Portuguese population
Primary education	0,33%	44,65%
Secondary education	2,33%	21,28%
High School	36,54%	17,52%
College	60,80%	16,54%

Except to gender distribution, the age and level of education distributions in the sample do not reflect general portuguese population.

The analysis of the answers to the open response question “What do you do for living” can be seen in the following table.

Table 8 - thematic analysis of the open response question of the profession in the Portuguese population's sample

Time	Number of responses
Student	109
Security / armed forces	44
Health care	42
Teacher / educator	35
Operating assistant	17
Unemployed / retired	10
Engineer	10
Businessman	7
Merchant	7
Factory worker	4
Total of valid responses	305

As to other mobile devices except cellphone, 95,9% were using portable too.

¹ INE, Censos 2011

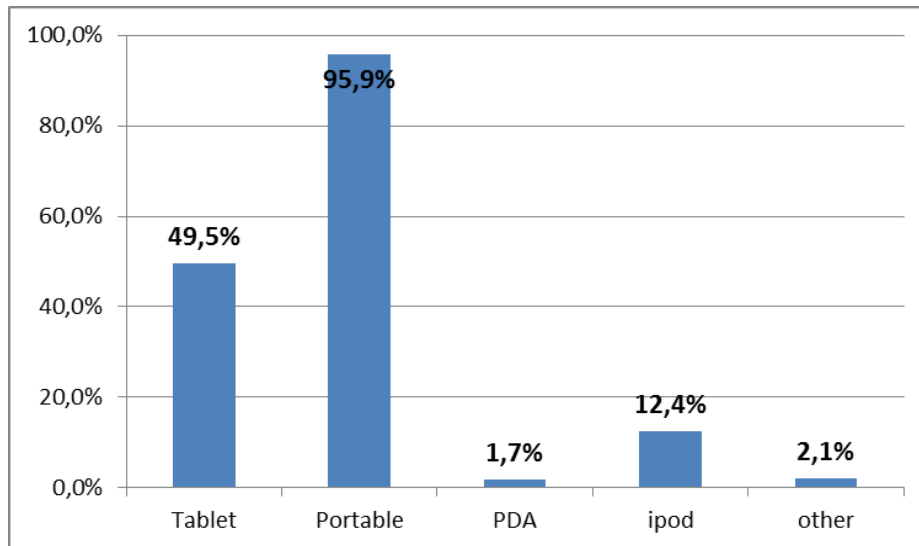


Figure 16 - mobile devices usage except cellphone in Portuguese population's sample

From the initial sample, 231 (76,7%) had smartphone. These constituted the subpopulation which was used for further study. In this sample of Portuguese population 23,3% never used a Smartphone. In this subpopulation, 96,5% claimed to know what an app was.

From this point on, it will be considered only those that knew what an app was. In this new group 97,8% knew someone that was using apps. Most part of these people (87,2%) had a daily use of apps.

In this subpopulation, 95,5% already used an app. From these, the majority (79,8%) was using apps daily.

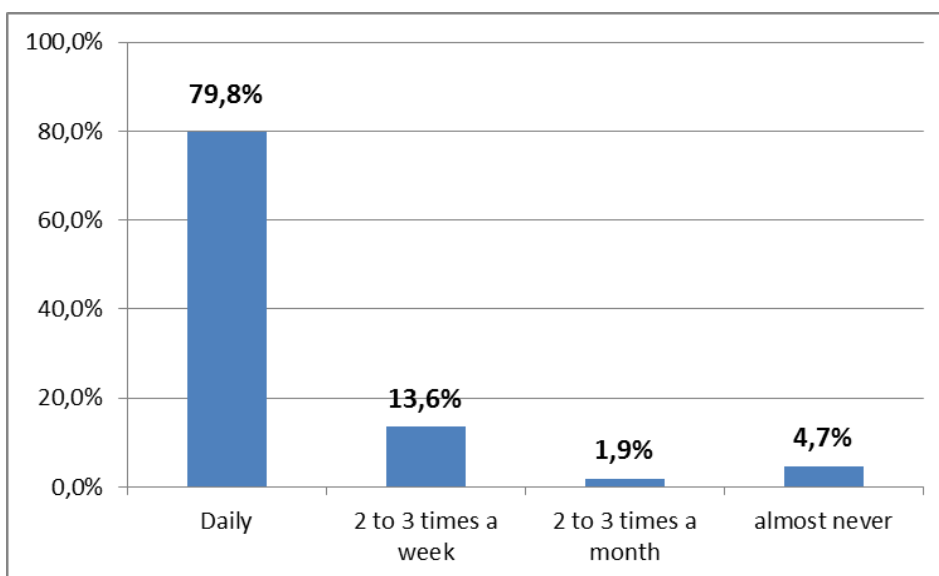


Figure 17 - frequency of usage of apps by the Portuguese population's sample

Table 9 and 10 show results of answers to the open response:

Table 9 - thematic analysis of the open response question of the time of use of apps in the Portuguese population's sample

Time	Number of responses
Less than 1 year	14
Less than 2 years	51
Less than 3 years	56
Less than 4 years	22
Less than 5 years	16
Less than 6 years	13
Less than 7 years	1
Less than 8 years	3
Less than 10 years	2
More than 10 years	7
Total of valid responses	185

Table 10 - thematic analysis of the open response question of the apps already used in the Portuguese population's sample

Apps' category	Number of responses
Social network	127
Communication	55
Physical exercise	44
Games	37
Maps / GPS	37
Entertainment	33
E-mail	28
Online stores	21
Business	13
Browsers	12
Total of valid answers	531

In the group of apps' users, 159 (62,9%) claimed to know what was a mHealth app. From this point on, it will be considered only those that knew what a mHealth app was.

In this subpopulation, 74,2% claimed to know at least one mHealth app. From this point on, it will be considered only those that knew at least one mHealth app.

The mHealth app with the best known theme was about physical activity (87,1%).

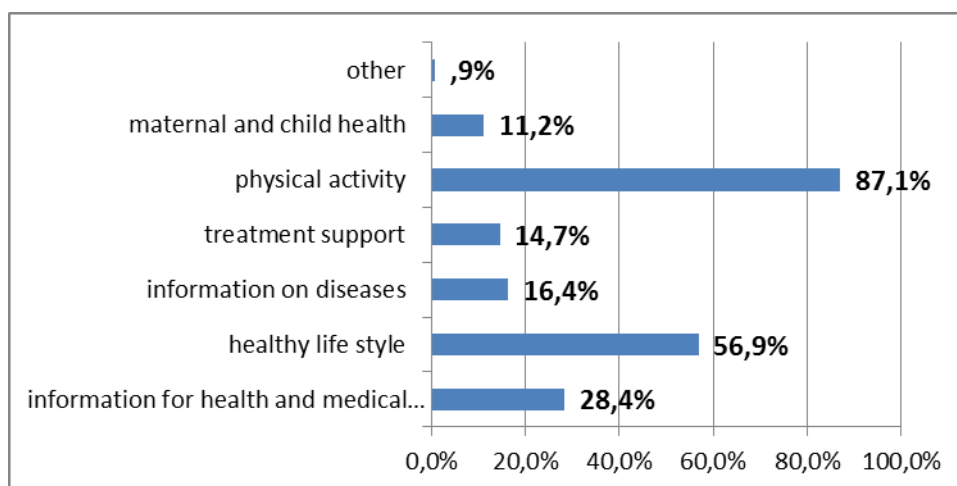


Figure 18 - perception of mHealth apps in portuguese population's sample

The analysis of the answers to the open response question “known mHealth apps” can be seen in the following table.

Table 11 - thematic analysis of the open response question of the known mHealth apps in the Portuguese population's sample

mHealth apps' category	Number of responses
Physical exercise	57
Healthy life style	16
Support of diagnosis and treatment	11
Clinical diary	5
Pregnancy	4
Pharmacy	3
Anatomy	3
Quit smoking	2
Female calendar	1
Total of valid responses	102

The most common way in which responders made contact with the mHealth apps was through research in the applications stores (60,3%) and the less common way was through medical advice (1,7%).

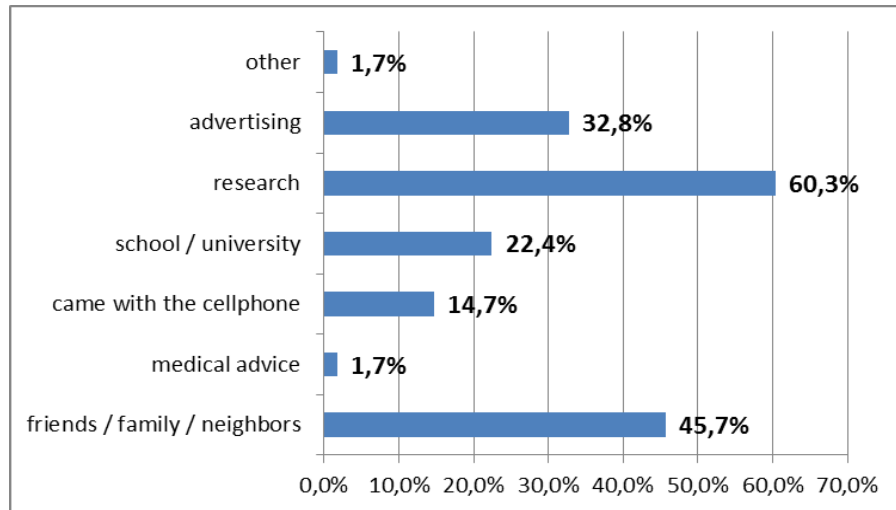


Figure 19 - forms to contact with mHealth apps in the Portuguese population's sample

From this population with perception of mHealth apps, 93 (78,8%) already used some mHealth app.

With this response it was created two subpopulations, one with those that already used mHealth apps that we defined as users of mHealth apps and another with those that never used that we defined as non-users of mHealth apps.

Non-users of mHealth

The main reason for this sample had not used the mHealth apps was not feeling the need to use it (56%).

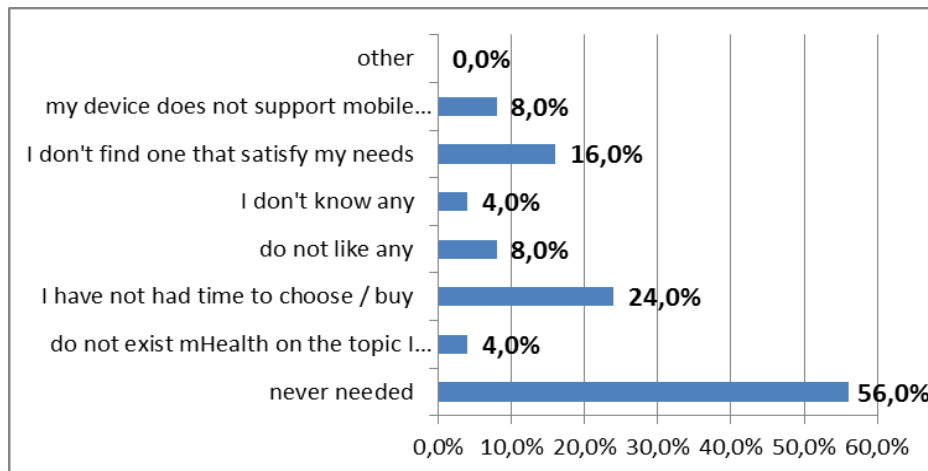


Figure 20 - reasons to not use mHealth apps in non-users of mHealth apps group in Portuguese population's sample

When given the chance to try out the mHealth apps the most desired topic was physical activity (48,1%).

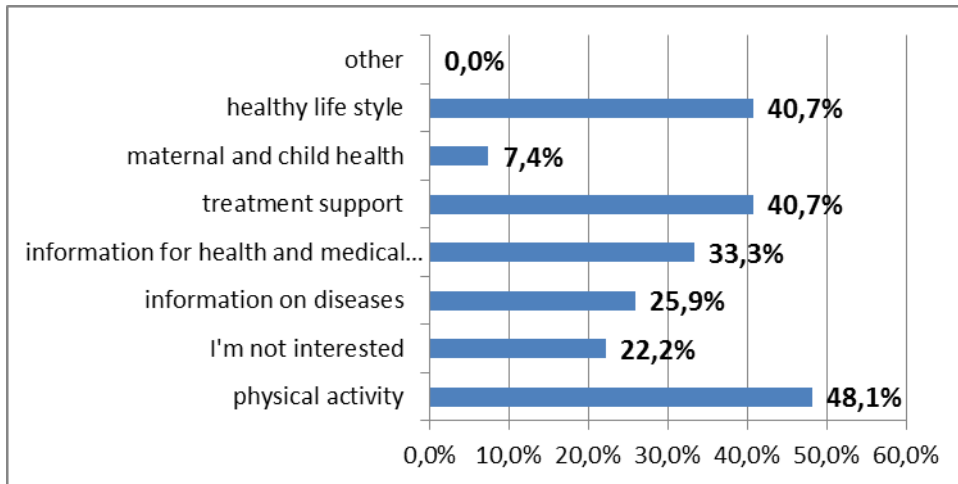


Figure 21 - desired mHealth apps by non-users of mHealth apps group in portuguese population's sample

Users of mHealth

The majority of this sample was introduced to the mHealth apps through themselves (94,4%).

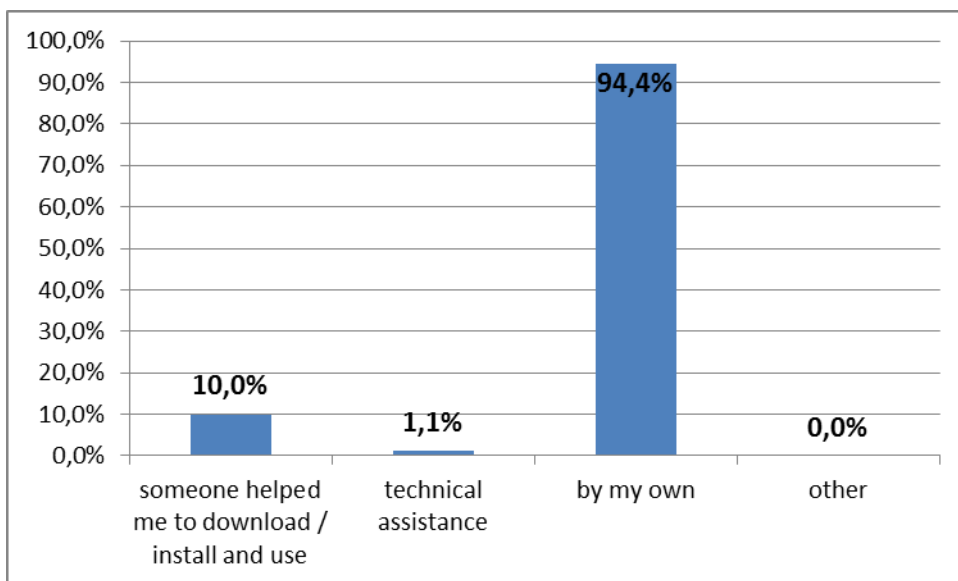


Figure 22 - ways of introduction to mHealth apps in users of mHealth apps group in Portuguese population's sample

The analysis of the answers to the open response question “mHealth apps that already used” can be seen in the following table.

Table 12 - thematic analysis of the open response question of the mHealth apps already used in the Portuguese population's sample

mHealth apps' category	Number of responses
Physical exercise	31
Healthy life style	8
Pregnancy	3
Clinical diary	3
Quit smoking	2
Anatomy	2
Female calendar	1
Pharmacies	1
Total of valid responses	51

The most used mHealth app was about physical activity (88,4%).

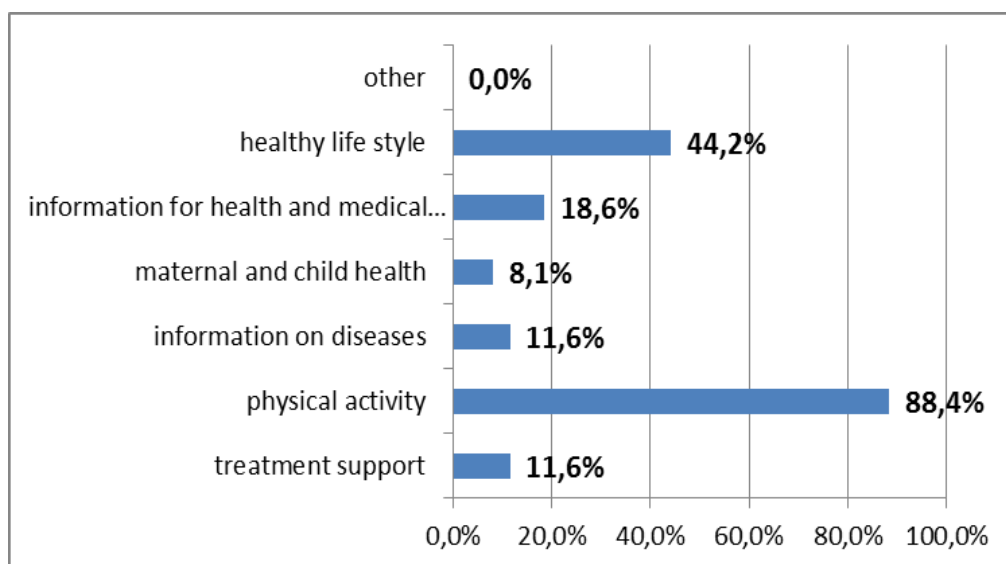


Figure 23 - usage of mHealth apps by theme in Portuguese population's sample

The main reason to use mHealth apps was to support physical exercise (74,2%).

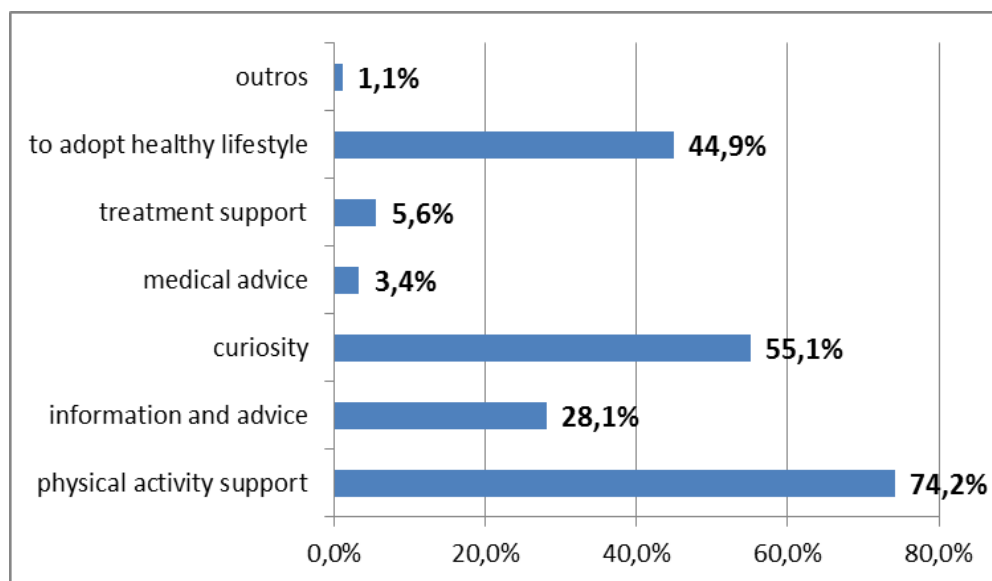


Figure 24 - reasons to use mHealth apps in portuguese population's sample

The analysis of the answers to the open response question “how long was using mHealth apps” can be seen in the following table.

Table 13 - thematic analysis of the open response question of the time of use of mHealth apps in the Portuguese population's sample

Time	Number of responses
Less than 1 year	18
Less than 2 years	21
Less than 3 years	20
Less than 4 years	6
More than 4 years	5
Total of valid responses	66

The majority (37,6%) used the mHealth apps two to three times a week.

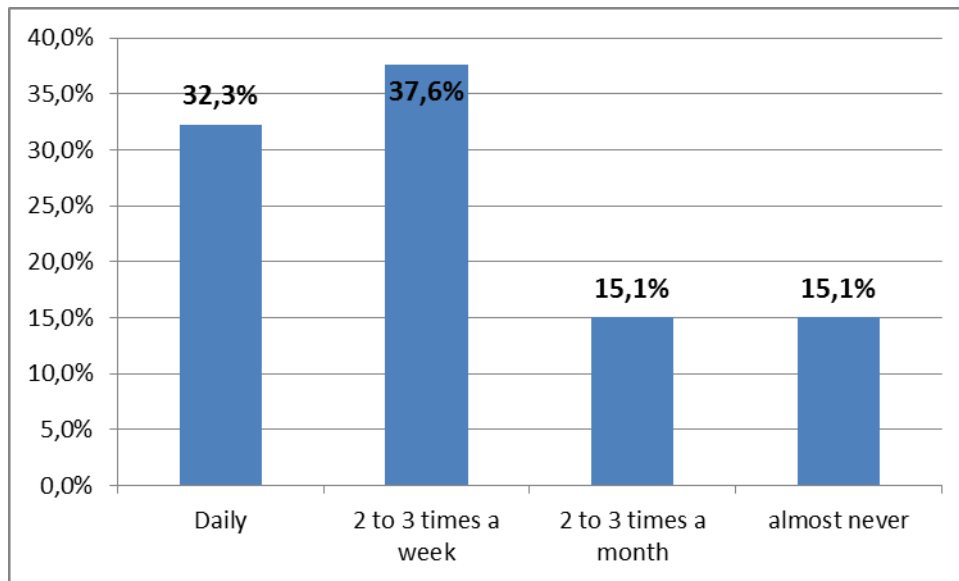


Figure 25 - frequency of usage of mHealth apps by the Portuguese population's sample

Dividing the mHealth apps in the ten leading death causes we see that 24,4% (n=20) was using this subgroup of mHealth apps and the theme with most used mobile applications was respiratory diseases (37,5%).

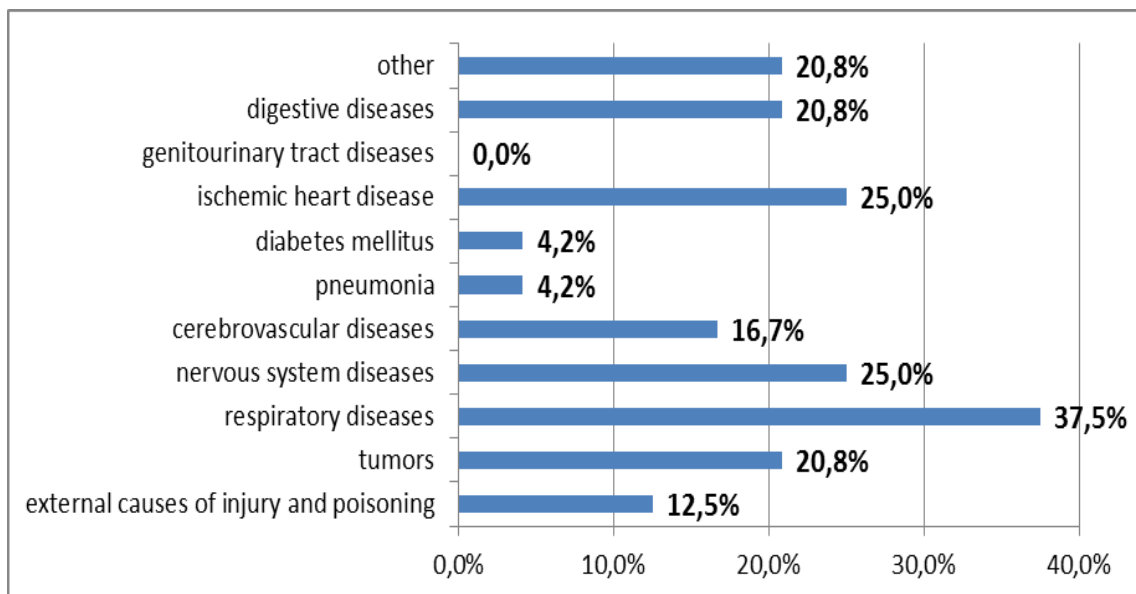


Figure 26 - usage of mHealth apps by leading death causes in Portuguese population's sample

2. Statistical inference

Some variables were grouped in order to increase the strength of the test used.

So, it was created 3 age groups - [18;23[, [23;28[and ≥ 28 - taking into account the distribution observed previously. Their distribution can be seen in the following charts.

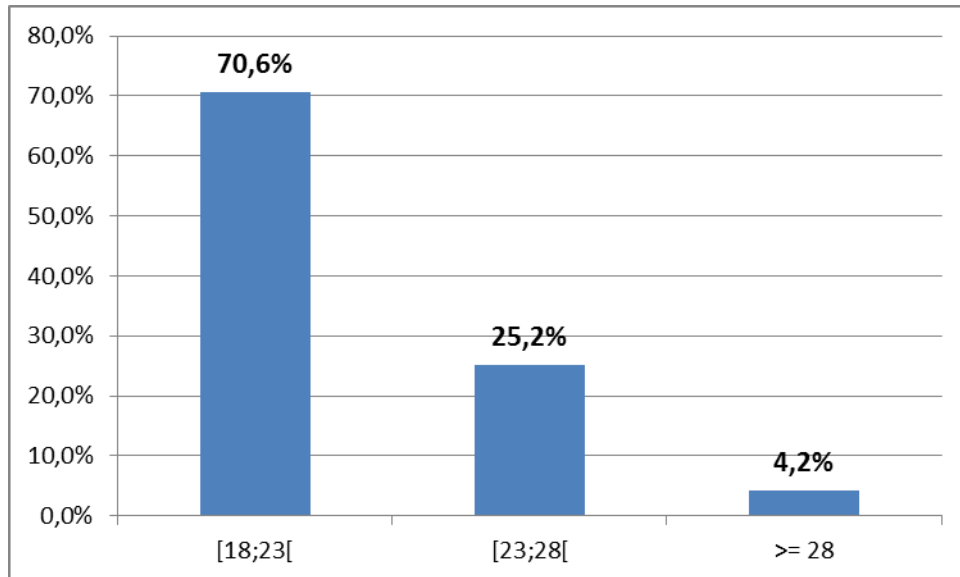


Figure 27 - grouped age distribution of medical students' sample

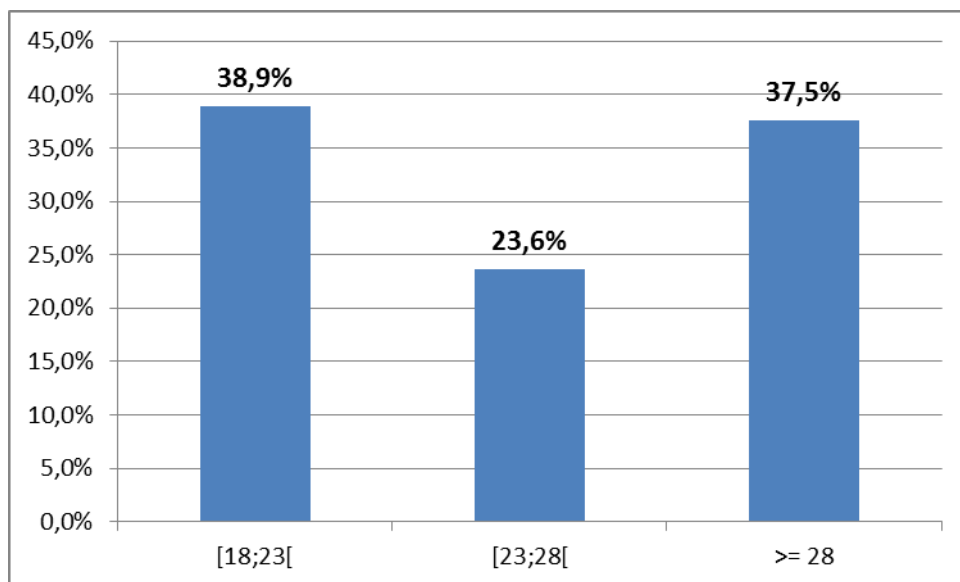


Figure 28 - grouped age distribution of Portuguese population's sample

The degree of education of the sample of portuguese population was divided in those with a college degree and those with no college degree.

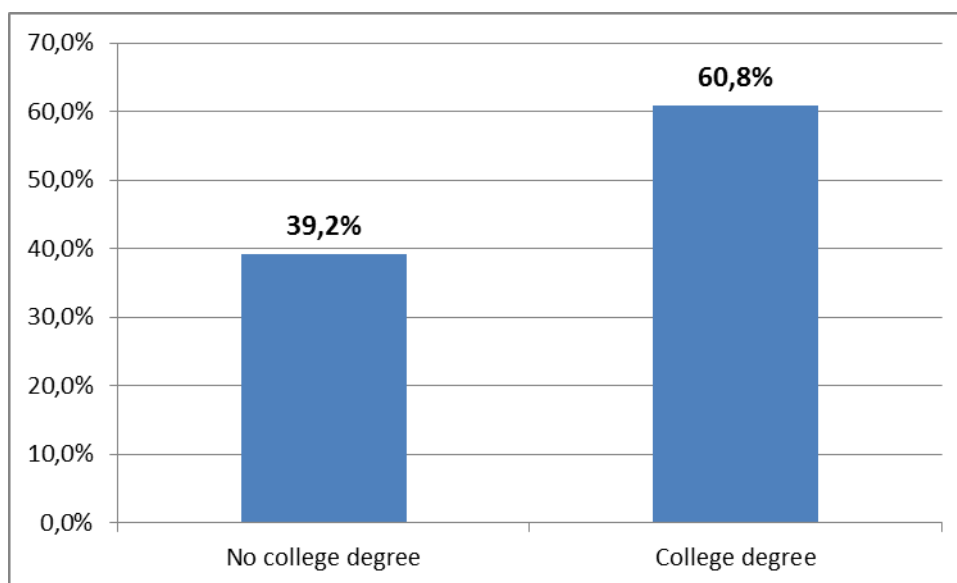


Figure 29 - grouped level of education of Portuguese population's sample

The frequency of use of mHealth apps was grouped in high frequent users - which were using daily or two or three times a week - and low frequent users - which were using two to three times a month or almost never.

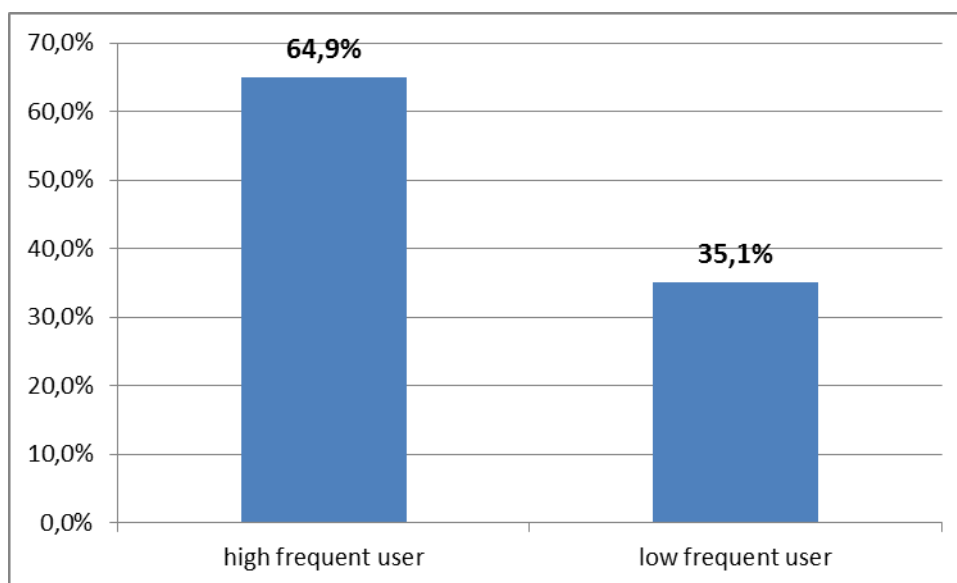


Figure 30 - grouped frequency of use of mHealth apps of medical students' sample

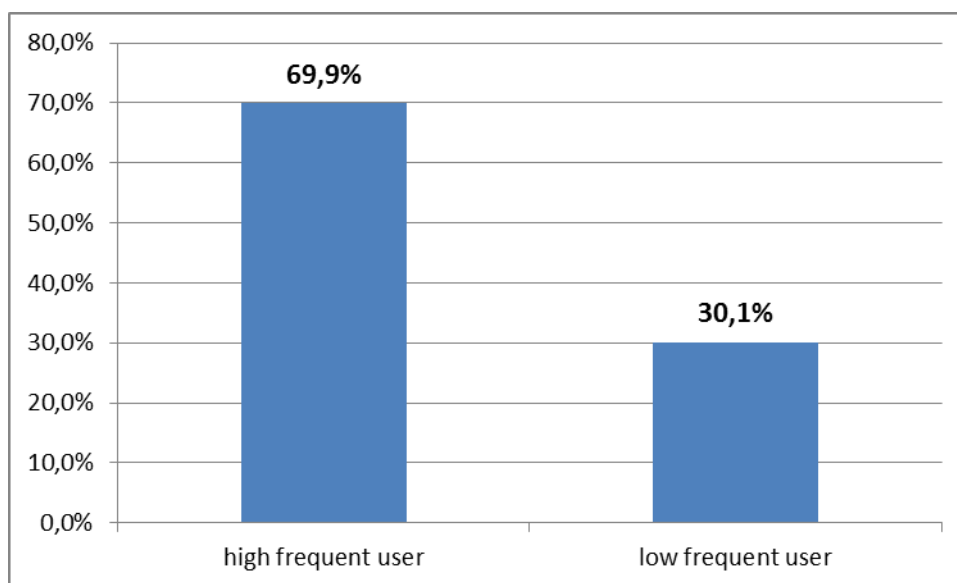


Figure 31 - grouped frequency of use of mHealth apps of Portuguese population's sample

1.1. Comparing level of education with:

Table 14 - inferential statistics comparing level of education with dependent variables

		Level of education		Total
		No college degree	College degree	
Awareness of mHealth apps	Yes	50 56,2%	86 64,2%	136 61,0%
	No	39 43,8%	48 35,8%	87 39,0%
	Total	89 100,0%	134 100,0%	223 100,0%

($\chi^2=1,438$; $gl=1$; $p=0,230 > 0,05$)

Perception of mHealth apps	Yes	33 66,0%	69 80,2%	102 75,0%
	No	17 34,0%	17 19,8%	34 25,0%
	Total	50 100,0%	86 100,0%	136 100,0%

($\chi^2=3,416$; $gl=1$; $p=0,065 > 0,05$)

Usage of mHealth apps	Yes	26 78,8%	56 81,2%	82 80,4%
	No	7 21,2%	13 18,8%	20 19,6%
	Total	33 100,0%	69 100,0%	102 100,0%

($\chi^2=0,080$; $gl=1$; $p=0,778 > 0,05$)

Frequency of usage of mHealth apps	High frequent user	19 73,1%	39 69,6%	58 70,7%
	Low frequent user	7 26,9%	17 30,4%	24 29,3%
	Total	26 100,0%	56 100,0%	82 100,0%

($\chi^2=0,101$; $gl=1$; $p=0,750 > 0,05$)

Usage of mHealth apps about the main causes of mortality	Yes	4 15,4%	16 28,6%	20 24,4%
	No	22 84,6%	40 71,4%	62 75,6%
	Total	26 100,0%	56 100,0%	82 100,0%

($\chi^2=1,674$; $gl=1$; $p=0,196 > 0,05$)

1.2. Comparing both samples

Table 15 - inferential statistics comparing both populations with dependent variables

		Sample		Total
		Students	General population	
Awareness of mHealth apps	Yes	258 65,6%	136 61,0%	394 64,0%
	No	135 34,4%	87 39,0%	222 36,0%
	Total	393 100,0%	223 100,0%	616 100,0%

($\chi^2=1,342$; $gl=1$; $p=0,247 > 0,05$)

Perception of mHealth apps	Yes	228 88,4%	102 75,0%	330 83,8%
	No	30 11,6%	34 25,0%	64 16,2%
	Total	258 100,0%	136 100,0%	394 100,0%

($\chi^2=11,705$; $gl=1$; $p=0,001 < 0,05$)

($\phi=0,172$; $p=0,001$)

Usage of mHealth apps	Yes	181 79,4%	82 80,4%	263 79,7%
	No	47 20,6%	20 19,6%	67 20,3%
	Total	228 100,0%	102 100,0%	330 100,0%

($\chi^2=0,044$; $gl=1$; $p=0,834 > 0,05$)

Frequency of usage of mHealth apps	High frequent user	124 68,5%	58 70,7%	182 69,2%
	Low frequent user	57 31,5%	24 29,3%	81 30,8%
	Total	181 100,0%	82 100,0%	263 100,0%

($\chi^2=0,131$; $gl=1$; $p=0,718 > 0,05$)

Usage of mHealth apps about the main causes of mortality	Yes	71 39,2%	20 24,4%	91 34,6%
	No	110 60,8%	62 75,6%	172 65,4%
	Total	181 100,0%	82 100,0%	263 100,0%

($\chi^2=5,489$; $gl=1$; $p=0,019 < 0,05$)

($\phi=0,144$; $p=0,019$)

1.3. Comparing age groups

Table 16 - inferential statistics comparing age groups with dependent variables

		Age groups			Total
		[18;23[[23;28[≥ 28	
Awareness of mHealth apps	Yes	228 63,0%	114 69,5%	52 57,8%	394 64,0%
	No	134 37,0%	50 30,5%	38 42,2%	222 36,0%
	Total	362 100,0%	164 100,0%	90 100,0%	616 100,0%

($\chi^2=3,835$; $gl=2$; $p=0,147 > 0,05$)

Perception of mHealth apps	Yes	195 85,5%	98 86,0%	37 71,2%	330 83,8%
	No	33 14,5%	16 14,0%	15 28,8%	64 16,2%
	Total	228 100,0%	114 100,0%	52 100,0%	394 100,0%

($\chi^2=7,004$; $gl=2$; $p=0,030 < 0,05$)

($\phi=0,133$; $p=0,030$)

Usage of mHealth apps	Yes	150 76,9%	86 87,8%	27 73,0%	263 79,7%
	No	45 23,1%	12 12,2%	10 27,0%	67 20,3%

	Total	195 100,0%	98 100,0%	37 100,0%	330 100,0%
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($\chi^2=5,894$; $gl=2$; $p=0,053 > 0,05$)

Frequency of usage of mHealth apps	High frequent user	100 66,7%	65 75,6%	17 63,0%	182 69,2%
	Low frequent user	50 33,3%	21 24,4%	10 37,0%	81 30,8%
	Total	150 100,0%	86 100,0%	27 100,0%	263 100,0%

($\chi^2=2,588$; $gl=2$; $p=0,274 > 0,05$)

Usage of mHealth apps about the main causes of mortality	Yes	47 31,3%	36 41,9%	8 29,6%	91 34,6%
	No	103 68,7%	50 58,1%	19 70,4%	172 65,4%
	Total	150 100,0%	86 100,0%	27 100,0%	263 100,0%

($\chi^2=3,006$; $gl=2$; $p=0,223 > 0,05$)

Results discussion

Some considerations from data collected will be drawn before moving on to the analysis of the hypotheses proposed.

First, except for gender distribution, the age and level of education distributions in the sample of Portuguese population do not reflect general Portuguese population. As is observed, the sample age distribution is biased towards the younger age groups and the level of education is biased towards the college degree group. This may be due the fact that the distribution of questionnaire was made through the social network Facebook®. Such bias may be because the sample reflected the social contacts of the observer which in turn were influenced by his gender, age and level of education.

An interesting detail obtained in the data is that the majority contacted for the first time with this technology through research (60,3%) or friends/family/neighbors (45,7%) and almost all subjects in the sample already used an app (94,9% student sample and 95,5% general population sample). This makes apps a very resourceful tool with many benefits and little need for monetary investment or need to teach how to use it because almost everyone already use it or learn to use it by themselves or through peers interaction. Through the analysis of literature, it can be seen that the most important factor for the use of apps is the mobile device (smartphone, tablet, etc.) that people have (10). Along with that, smartphone nowadays are seen almost as a dress part because people that have it keeps it with them at all time (11). This can be seen in both samples through a great number of high frequent users - 64,9% in medical students and 69,9% in Portuguese population. Those findings give support to the premise that this technology might be used in the public healthcare system. This tool was recognized as such a valuable resource by the World Health Organization (WHO) and United Nations (UN) that was created the Global Observatory for eHealth (GOe). The mission of the GOe is to improve health by providing member states with strategic information and guidance on effective practices and standards in eHealth. According to his last survey, the “smartphone applications market phenomena” had a strong impact in many industries. One of these industries is healthcare where it can, not only improve its delivery, but also promote a fast dissemination of medical information (12). This utopia however is still taking its first steps.

For now, the main drivers of development of mHealth apps continue to be commercial companies (13) as it can be seen, for example, through a great bet in the apps about physical exercise (14).

This trend can be seen in the responses of both multiple choice questions and open-ended questions, where this kind of mHealth app is the most popular (known and used) in both samples. This tendency, seen not only in this study but also in the bibliography (3,14), may be due to social pressure towards keeping oneself in good physical shape. As these apps turn physical exercise into something more appealing and fun, it can induce/promote exercise. At the same time, it can provide a sense of integration since we keep abreast of the latest technological innovations shared among our peers who have an influence towards starting using apps and what kind of apps are used. One last reason to this subset of mHealth apps being the most used may lie in the large market supply due to not being required great scientific foundations owing to the lack of supervision of such apps (15).

A very interesting note is that the most used mHealth apps about the main causes of death are very different in the medical students sample and in the Portuguese population sample. The students' sample had a higher usage of these kind of mHealth apps, a broader distribution and the themes most used were about ischemic heart disease and respiratory diseases. This kind of distribution may be due the field of study of this population because medical students need to have a general knowledge about the leading causes of death of the country where they study and this knowledge may be extendable to the preference of mHealth apps used. At the same time, this technology can provide support during the academic path which might lead to a greater awareness, perception and use of it. Mayfield, C. H. et al recommended that educational programs consider the use of mobile technology in some lessons like anatomy laboratory (16). So, it cannot be ruled out the importance that the possible use apps in medical schools as a complement the training of students.

On the other hand, the general portuguese population sample had fewer responders using this kind of mHealth apps, and a more narrow distribution. The main themes of interest were respiratory diseases, nervous system diseases and ischemic heart diseases. This distribution reflects the main concerns of the population since these diseases have a great morbidity and mortality. The literature review on mHealth apps about the main causes of death points the use of these apps as a useful tool for the prevention and management of diseases that causes high rates of mortality (8). As the majority of the work done is in the commercial field instead of research field (17), the developers focus on typical diseases in high-income countries. So, heart diseases are one of the most researched and with more apps along with HIV/AIDS. The latter not because it is a major cause of death but due to it being a very popular disease in richer countries. On the other hand, lower respiratory infections and diarrheal diseases are among the main causes of death in low-income countries therefore, having much less research and fewer apps (8).

Comparing the level of awareness with any of the independent variables used it was not found a statistical significant relationship (college degree, $p=0,230$; medical student, $p=0,247$; age

groups, $p=0,147$). This is easily explained taking into account that the vast majority of mHealth apps are developed for commercial purposes (8). Thus, as every commercial product, the goal of the developers is to reach every person independently of their level of education making awareness of mHealth apps almost ubiquitous.

Turning the focus of attention to the perception of mHealth apps, a statistical significance with being a medical student ($p=0,001$) and with the age group below 28 years ($p=0,030$) and a tendency towards statistical significance with having a college degree ($p=0,065$) was found. This tendency and the weakness of the other two associations (medical student, $\phi=0,172$; age group, $\phi=0,133$) reveals the need for further study with sample that respects the population characteristics. As stated previously, the goal of the developers is to reach every person as can be seen through the high awareness and perception. However, the perception may be influenced by other factors as surroundings, peers interaction, purchasing power and predisposition to this kind of technology. With a higher level of education a higher salary is expected (18) and thus a higher purchasing power that allows an easier access to the technology needed. It is expected that the peers have a similar condition and thus an easy access to the technology. This together with a slight higher awareness may lead to a much greater perception of mHealth apps in the population with a college degree. Concerning the medical student sample, it is easily understandable that as this apps fall in the field of study and interest of this subpopulation, there will be a natural tendency towards a higher perception of these tools. As to the age group, in the older age groups is seen a lower acceptance towards the use of new technology (19). This lack of acceptance may lead to a lower perception of new technologies and consequently fewer mHealth apps.

Regarding the usage of mHealth apps, it can be seen that the usage of mHealth apps is roughly equal between those with college degree and without (81,2% and 78,8%, respectively) and between medical students and general population (79,4% and 80,4%, respectively) resulting in non-significant tests ($p=0,778$ and $p=0,834$, respectively). This indicates the importance of disseminate information about this new tool in the population to further increase his awareness and perception since almost all of those that are aware and have some perception of mHealth apps uses them. At the same time, it also supports the argument of a great cost-benefit ratio in implementing this tool since most of the population already is aware and have some perception of it and therefore can use it more. However, there is a tendency towards statistical significance to a greater use by the age group [23;28] ($p=0,053$). Despite the high acceptance of new technologies among the younger age groups, their purchasing power is low due to a low employment rate². The monetary factor may only be overcome in this age group and, combined with the high acceptance of new technologies, lead to easier access to mobile devices.

² INE, Inquérito ao Emprego (05/05/2015)

Focusing in the frequency of high frequent users of mHealth apps, it was not found statistical significance due to a similar frequency of usage between those with a college degree and those without (69,6% and 73,1%, respectively)($p=0,750$) and between medical students and general population (68,5% and 70,7%, respectively)($p=0,718$). In the case of age groups, it was also not found statistical significance ($p=0,274$) despite a greater number of high frequent users in the age group [23;28]. One might think that from the point where the smartphone is brought (main driver to the usage of mHealth apps) (10) people tend to keep it all the time with them leading to a high frequency of high frequent users (11). As this phenomenon cuts across all users (independently of level of education, age group and area of expertise) the frequency of use would not be influenced by those variables. Nevertheless, the greater high frequent users in the age group [23;28] may be due the slight impact of high acceptance of this technology and increased purchase power which leads to a much important variable that is own a smartphone.

Finally, through statistical analysis it was not found a statistical significance between the use of mHealth apps about the main causes of death and having a college degree ($p=0,196$) or age groups ($p=0,223$). Still, a statistical significance with being a medical student ($p=0,019$) was found. Although there was a high awareness, perception and usage of mHealth apps, very few people uses mHealth apps about the main causes of death. This may be due a lack of awareness and/or perception of this subset of mHealth app. However, the large discrepancy between usage of mHealth app and usage of this subset of mHealth apps raises the possibility of the questionnaire not being clear and/or the responder not being conversant with the topic. This possibility is also supported by literature where, among those with a smartphone, there is a high acceptance and dissemination of health programs that are based on mHealth apps (20). This highlights the importance of this tool because it has a well-documented potential (5-7), the patients have an overall positive attitude towards it (21) and feel comfortable using it (22). Despite all of this, similarly to the perception of mHealth apps, this subset of mHealth apps are the main study focus of the medical student population and so, naturally, they feature a high frequency of users. However, this statistical significance is undermined by a low strength ($\phi=0,144$) so, more studies are needed to ascertain the nature of this relationship.

Conclusion

Some of the conclusions of this study can be seen in the poster presented in the International Work-Conference on Bioinformatics and Biomedical Engineering 2015.

This study highlights some relevant questions not only about the awareness, perception and use of mHealth apps but also some applications of this technology in the medical practice.

Despite slight variations, a high awareness, perception and usage of mHealth apps independently of the sample was observed. The frequency of usage was also very high and it is thought that the most important factor might be the mobile device, as seen in the available bibliography.

From the data collected, and review of the literature, it is clear that mHealth apps have a great applicability in the National Health System. It has a very good starting point with great awareness, perception and use by population and promising results so far taking into account the bibliography. Further studies must be done to assess the cost-effectiveness of these tools. On the other hand, this technology might be a potential learning platform in the medical schools as some data of this study as well as the review of literature points out.

It was visible that those with a smartphone have a high awareness, perception and usage of mHealth apps. It can be considered that possessing a smartphone is the key element to the use of those tools and therefore if their use in the population is a possibility to be considered, this must be taken into account.

The most popular mHealth app, in the literature and in this study, continues to be those concerning about physical activity. This reveals not only the result of social pressure to keep fit but also the work of commercial companies in the development of apps. It is this investment in this technology that needs to be done so it can be spread to the people becoming a new vehicle of care.

Despite all these benefits it seems that older age groups have some reluctance in using apps. This might compromise its use in these age groups and a different approach must be designed. Perhaps the adaptation of existing apps to the age group or use support might dissolve this reluctance.

In the data collected, a decline from the use of mHealth apps to the mHealth apps about the main causes of death was noted. This might be due to some limitations of this study, and despite the fact that some bibliography defies these results, this must not be taken lightly.

Since these mHealth apps can be presented as an added value in the prevention and management of the leading causes of death, this possibility opens a window of intervention by the national health system in an effort to increase the use of this subset of mHealth apps. Further studies are needed to unveil the real nature of this variable.

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Annexs

Annex A

Consciência, perceção e uso de aplicações móveis para a saúde e bem-estar

Este questionário é destinado aos estudantes de medicina de todo o país, com a finalidade de elaborar a minha dissertação de mestrado sobre “Consciência, perceção e uso de aplicações móveis para a saúde e bem-estar”.

Os dados recolhidos são anónimos e não é possível relacionar as respostas do questionário com o endereço de correio eletrónico de quem responde.

*Required

1. Idade*

2. Ano que frequenta

Mark only one oval.

1º

2º

3º

4º

5º

6º

3. Faculdade

Mark only one oval.

UAlg-DCBM

ICBAS

NMS-FCM

UBI-FCS

FMUC

FMUP

UM-ECS

FMUL

4. Género

Mark only one oval.

Masculino

Feminino

5. Possui telemóvel?*

Mark only one oval.

Sim

Não *After the last question in this section, stop filling out this form.*

6. Que outros dispositivos móveis possui?

Check all that apply.

Tablet

Portátil

PDA

Ipod

Other: _____

7. O seu telemóvel é um smartphone?

Mark only one oval.

Sim

Não

8. Que sistema operativo utiliza nos seus dispositivos móveis?

Check all that apply.

Android

Apple iphone

RIM blackberry

- Windows mobile
- Palm/WebOS
- Windows 7
- Symbian
- Other: _____

9. Sabe o que é uma aplicação móvel?*

Mark only one oval.

Sim

Não

Stop filling out this form.

10. Conhece alguém que utilize aplicações móveis?

Mark only one oval.

Sim

Não

11. Se sim, com que frequência essa pessoa utiliza aplicações móveis?

Mark only one oval.

Diariamente

2 a 3 vezes por semana

2 a 3 vezes por mês

Quase nunca

12. Alguma vez utilizou aplicações móveis?

Mark only one oval.

Sim

Não

13. Se sim, com que frequência utiliza aplicações móveis?

Mark only one oval.

Diariamente

2 a 3 vezes por semana

2 a 3 vezes por mês

Quase nunca

14. Há quanto tempo utiliza aplicações móveis?

15. Que aplicações móveis já utilizou?

Indique todas as aplicações que já utilizou e faça um pequeno comentário sobre cada uma.

16. Sabe o que é uma aplicação móvel para a saúde e bem-estar?*

Mark only one oval.

Sim

Não *Skip to question 31.*

17. Conhece alguma aplicação móvel para a saúde e bem-estar?

Mark only one oval.

Sim

Não

18. Conhece alguma aplicação móvel para a saúde e bem-estar sobre os seguintes temas?

Check all that apply.

Informação para a saúde e conhecimento médico

Hábitos de vida saudáveis

Informação sobre patologia específica

Apoio ao tratamento

Exercício físico

Saúde materno-infantil

Other: _____

19. Que aplicações para a saúde conhece?

Indique todas as aplicações que conhece e faça um pequeno comentário sobre cada uma.

20. Como teve/tem tido conhecimento das aplicações móveis para a saúde e bem-estar?

Check all that apply.

Amigos / família / vizinhos

Aconselhamento médico

Já vinha com o telemóvel

Escola / universidade

Pesquisa

Publicidade

Other: _____

21. Já utilizou alguma aplicação para a saúde e bem-estar?*

Mark only one oval.

Sim *Skip to question 24.*

Não *Skip to question 22.*

22. Porque nunca utilizou aplicações para a saúde e bem-estar?

Check all that apply.

Nunca necessitei

Não existem apps sobre o tema que necessito

- Ainda não tive tempo de escolher/comprar
- Não gosto de nenhuma
- Não conheço nenhuma
- Não encontro nenhuma que satisfaça as minhas necessidades
- O meu dispositivo não suporta aplicações móveis
- Other: _____

23. Se tivesse oportunidade de utilizar alguma aplicação para a saúde e bem-estar em qual dos temas estaria interessado?

Check all that apply.

- Exercício físico
- Não estou interessado em utilizar
- Informação sobre patologia específica
- Informação sobre a saúde e conhecimento médico
- Apoio ao tratamento
- Saúde materno-infantil
- Hábitos de vida saudáveis
- Other: _____

Skip to question 31.

24. Como foi introduzido ao no uso das aplicações móveis para a saúde e bem-estar?

Check all that apply.

- Alguém me ajudou a descarregar/instalar e usar
- Por assistência técnica
- Por mim próprio
- Other: _____

25. Que aplicações para a saúde e bem-estar já utilizou?

Indique todas as aplicações que já utilizou e faça um pequeno comentário sobre cada uma.

26. Já utilizou alguma aplicação para a saúde e bem-estar sobre os seguintes temas?

Check all that apply.

- Apoio ao tratamento
- Exercício físico
- Informação sobre patologia específica
- Saúde materno-infantil
- Informação para a saúde e conhecimento médico
- Hábitos de vida saudáveis
- Other: _____

27. Porque utilizou essas aplicações?

Check all that apply.

- Apoio à prática de exercício físico
- Como informação e aconselhamento
- Curiosidade
- Aconselhamento médico
- Adjuvante no seguimento de uma terapêutica
- Para adotar estilo de vida saudável
- Other: _____

28. Há quanto tempo é que utiliza aplicações para a saúde e bem-estar?

29. Com que frequência utiliza aplicações para a saúde e bem-estar?

Mark only one oval.

- Diariamente
- 2 a 3 vezes por semana
- 2 a 3 vezes por mês
- Quase nunca

30. Já utilizou aplicações para a saúde e bem-estar sobre algum dos seguintes temas?

Check all that apply.

- Causas externas de lesão e envenenamento
- Tumores
- Doenças do aparelho respiratório
- Doenças do sistema nervoso
- Doenças cerebrovasculares
- Pneumonia
- Diabetes mellitus
- Doença isquêmica do coração
- Doença do aparelho geniturinário
- Doença do aparelho digestivo
- Other: _____

Annex B

Consciência, perceção e uso de aplicações móveis para a saúde e bem-estar

Este questionário é destinado à população portuguesa, com a finalidade de elaborar a minha dissertação de mestrado sobre “Consciência, perceção e uso de aplicações móveis para a saúde e bem-estar”.

Os dados recolhidos são anónimos e confidenciais.

*Required

1. Idade*

2. Género

Mark only one oval.

Masculino

Feminino

3. Nível de escolaridade

Mark only one oval.

Primeiro ciclo

Segundo ciclo

Secundário

Ensino superior

4. Profissão

5. Vive atualmente em Portugal?*

Mark only one oval.

Sim

Não

Stop filling out this form.

6. Possui telemóvel?*

Mark only one oval.

Sim

Não *After the last question in this section, stop filling out this form.*

7. Que outros dispositivos móveis possui?

Check all that apply.

- Tablet
- Portátil
- PDA
- Ipod
- Other: _____

8. O seu telemóvel é um smartphone?

Mark only one oval.

Sim

Não

9. Que sistema operativo utiliza nos seus dispositivos móveis?

Check all that apply.

- Android
- Apple iphone
- RIM blackberry
- Windows mobile
- Palm/WebOS
- Windows 7
- Symbian
- Other: _____

10. Sabe o que é uma aplicação móvel?*

Mark only one oval.

Sim

Não

Stop filling out this form.

11. Conhece alguém que utilize aplicações móveis?

Mark only one oval.

Sim

Não

12. Se sim, com que frequência essa pessoa utiliza aplicações móveis?

Mark only one oval.

Diariamente

2 a 3 vezes por semana

2 a 3 vezes por mês

Quase nunca

13. Alguma vez utilizou aplicações móveis?

Mark only one oval.

Sim

Não

14. Se sim, com que frequência utiliza aplicações móveis?

Mark only one oval.

Diariamente

2 a 3 vezes por semana

2 a 3 vezes por mês

Quase nunca

15. Há quanto tempo utiliza aplicações móveis?

16. Que aplicações móveis já utilizou?

Indique todas as aplicações que já utilizou e faça um pequeno comentário sobre cada uma.

17. Sabe o que é uma aplicação móvel para a saúde e bem-estar?*

Mark only one oval.

Sim

Não

Skip to question 32.

18. Conhece alguma aplicação móvel para a saúde e bem-estar?

Mark only one oval.

Sim

Não

19. Conhece alguma aplicação móvel para a saúde e bem-estar sobre os seguintes temas?

Check all that apply.

Informação para a saúde e conhecimento médico

Hábitos de vida saudáveis

Informação sobre patologia específica

Apoio ao tratamento

Exercício físico

Saúde materno-infantil

Other: _____

20. Que aplicações para a saúde conhece?

Indique todas as aplicações que conhece e faça um pequeno comentário sobre cada uma.

21. Como teve/tem tido conhecimento das aplicações móveis para a saúde e bem-estar?

Check all that apply.

- Amigos / família / vizinhos
- Aconselhamento médico
- Já vinha com o telemóvel
- Escola / universidade
- Pesquisa
- Publicidade
- Other: _____

22. Já utilizou alguma aplicação para a saúde e bem-estar?*

Mark only one oval.

- Sim *Skip to question 25.*
- Não *Skip to question 23.*

23. Porque nunca utilizou aplicações para a saúde e bem-estar?

Check all that apply.

- Nunca necessitei
- Não existem apps sobre o tema que necessito
- Ainda não tive tempo de escolher/comprar
- Não gosto de nenhuma
- Não conheço nenhuma

- Não encontro nenhuma que satisfaça as minhas necessidades
- O meu dispositivo não suporta aplicações móveis
- Other: _____

24. Se tivesse oportunidade de utilizar alguma aplicação para a saúde e bem-estar em qual dos temas estaria interessado?

Check all that apply.

- Exercício físico
- Não estou interessado em utilizar
- Informação sobre patologia específica
- Informação sobre a saúde e conhecimento médico
- Apoio ao tratamento
- Saúde materno-infantil
- Hábitos de vida saudáveis
- Other: _____

Skip to question 32.

25. Como foi introduzido no uso das aplicações móveis para a saúde e bem-estar?

Check all that apply.

- Alguém me ajudou a descarregar/instalar e usar
- Por assistência técnica
- Por mim próprio
- Other: _____

26. Que aplicações para a saúde e bem-estar já utilizou?

Indique todas as aplicações que já utilizou e faça um pequeno comentário sobre cada uma.

27. Já utilizou alguma aplicação para a saúde e bem-estar sobre os seguintes temas?

Check all that apply.

- Apoio ao tratamento
- Exercício físico
- Informação sobre patologia específica
- Saúde materno-infantil
- Informação para a saúde e conhecimento médico
- Hábitos de vida saudáveis
- Other: _____

28. Porque utilizou essas aplicações?

Check all that apply.

- Apoio à prática de exercício físico
- Como informação e aconselhamento
- Curiosidade
- Aconselhamento médico
- Adjuvante no seguimento de uma terapêutica
- Para adotar estilo de vida saudável
- Other: _____

29. Há quanto tempo é que utiliza aplicações para a saúde e bem-estar?

30. Com que frequência utiliza aplicações para a saúde e bem-estar?

Mark only one oval.

- Diariamente
- 2 a 3 vezes por semana
- 2 a 3 vezes por mês
- Quase nunca

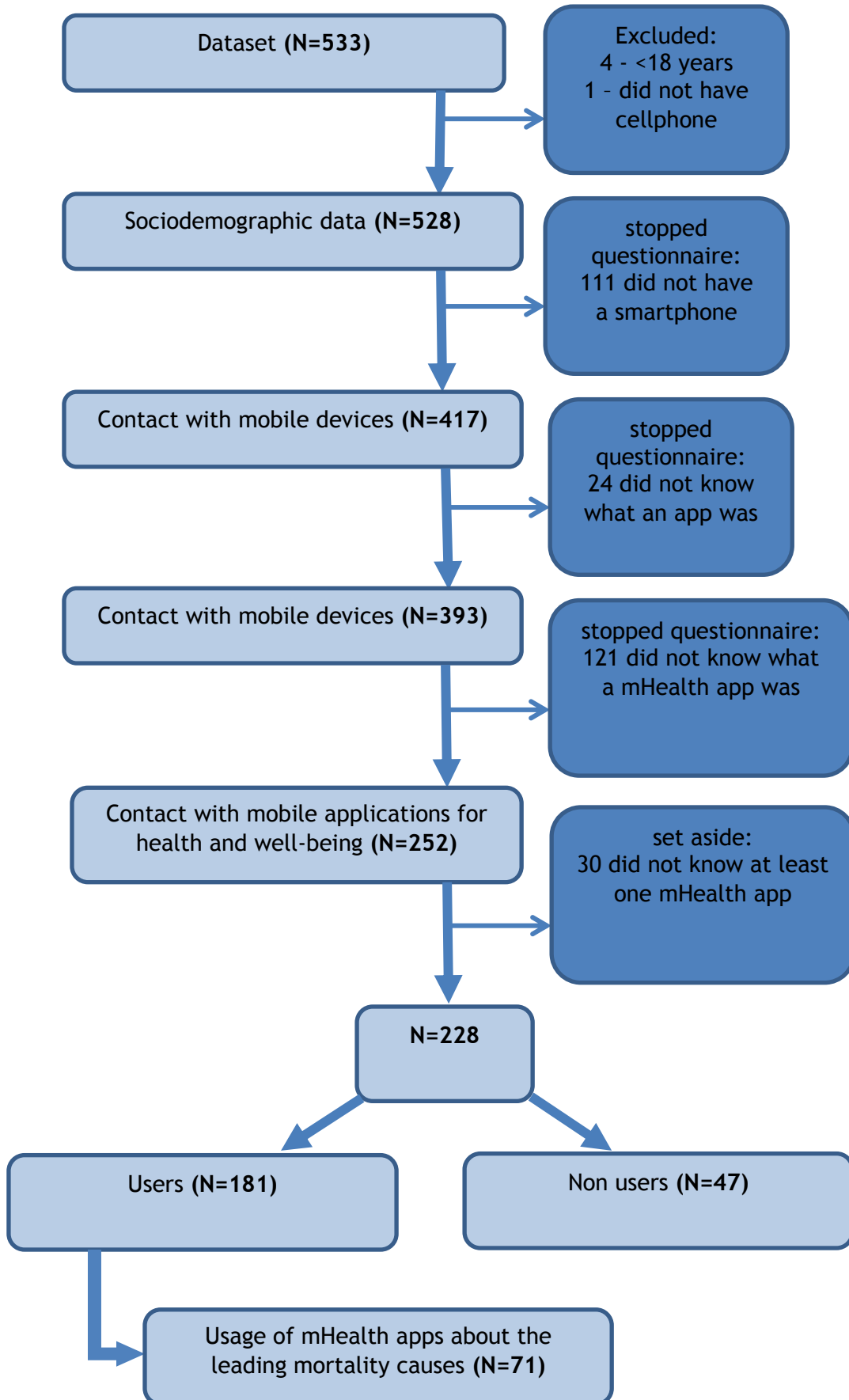
31. Já utilizou aplicações para a saúde e bem-estar sobre algum dos seguintes temas?

Check all that apply.

- Causas externas de lesão e envenenamento
- Tumores
- Doenças do aparelho respiratório
- Doenças do sistema nervoso
- Doenças cerebrovasculares
- Pneumonia
- Diabetes mellitus
- Doença isquémica do coração
- Doença do aparelho geniturinário
- Doença do aparelho digestivo
- Other: _____

Annex C

Questionnaire scheme to the medical students' population



Questionnaire scheme to the general population

