

Development portal

“Active longevity” of RK population and preliminary results

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Abstract. This paper describes the main elements of the portal and presents preliminary results of frequency occurrence analysis of cardiovascular diseases in elderly age and income level of the respondent on the basis of epidemiological screening performed on the basis of data collected on our site.

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Introduction

Increasing the duration of active life is one of the most important problems in modern gerontology in the world, including Kazakhstan [1]. The solution of these problems is associated with using information and communication technologies (ICT) [2-5]. Gerontological RK portal, which has no analogues in the countries of the former USSR, will include information on major aspects of the aging in RK. Portal will be a platform for exchange of experiences, publishing the research results, getting generalized and personalized information.

1. Work actuality

Gerontological researches in the world are associated with the rapid aging of the population in developed countries. This process is caused not only by decreasing the birth rate, but also by the increase in life expectancy. For example, according to European experts in 2060 one third of the Europe’s population will reach age 80 and elder. At the same time there is a great number of single people and people who need intensive medical care in a described group of large population.

In this regard, the main tasks set forth by the scientific and medical community of developed countries are to prevent the social isolation of the senior citizens, creating conditions for maintaining an active lifestyle for elder people and their participation in the labor market.

To achieve these ambitious goals the world community makes a range of initiatives of medical, social and techno-

logical types by widely using all modern information and communication technologies. It is not just proper measures to maintain health, but also the initiatives in the field of business, for employment, using of ICT to reduce the costs of health care and care for elderly patients. As a result of these efforts during the period from years 2010 to 2013 only in Europe, public and private investment for research and innovation to improve lives of elder people will reach more than 1 billion €.

Kazakhstan is a developing country with country’s population also aging. In Kazakhstan, in January 1, 2010 the number of people aged 65 years and older was 7.14% of the total population of the country. UN experts consider Kazakhstan as a state with accelerated aging. According to the forecast, by 2050, 25 % of the elder people are expected to make the country’s population.

Due of this, extension of active life, reducing the costs of health care, increasing demand of the elder in labor market becomes a serious issue to Kazakh society.

Improving care for elder people, comprehensive solution of their medical-biological, social and psychological aspects is one of the priorities defined by the State program “Salamatty Kazakhstan” for 2011-2015, approved by Presidential Decree of Kazakhstan for 29.11.2010, Nr.1113.

Economic analysis has shown that we need to find ways and new technologies to improve the quality of services and to reduce costs. Initiatives that are offered in different regions are usually connected with using the *Information and*

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Communication Technologies (ICT).

Although the group of elder persons is heterogeneous in the sense of education, income and type of illnesses associated with age, the elder forms the group of maximum risk and is considered to be excluded from the benefits of the Information Society. According to the recent study, more than 60% of people over 50 in Europe feel that their needs are ignored by current ICT services and equipment [4].

Policies and initiatives aimed to improve the conditions and technology for elder people in the information society can achieve a triple purpose.

1. Facilitating usage of the information society tools and services for elderly people, among other things removes barriers, making ICT tools easier for everyone and encourages people to look for the better, increasing their independence, improving health, increasing the ability to participate in working environment and be active in society.
2. ICT can help to increase the efficiency and quality of social services and health in aging society, and promote financial sustainability of these services in the future.
3. Due to the aging as global phenomenon, new ICT products and services might ensure the needs of aging society providing an opportunity in corresponding industries to become leaders and exporters in the global market.

At the same time we have to point out that the potential of ICT in gerontological market is very high: the fact is that Europeans aged 65+ own funds of over €3000 milliard. In Kazakhstan, the situation is different, but due to the increasing elderly population (1634974 people at the beginning of 2011), an increasing of Internet usage, income growth, as well as increasing number of specialists in the field of gerontology and geriatrics, the potential of ICT will also rise.

Thus, increasing duration of people active life is one of the most important problems of modern gerontology in the world, including Kazakhstan.

Solution to these problems is connected with application of ICT. The work of gerontological portal development is in progress. This portal does not have any analogue in the countries of former USSR and in neighboring countries.

2. Objectives and functions of the portal

The portal is supposed to be as an input point to “the gerontological space” of Kazakhstan, including information about major aspects of aging of Kazakhstan population. It will be as a platform for the exchange of experience, the publication of research results, for generalized and personified information reception about elder person’s health.

Based on the collected information using methods of scientific forecasting, searching patterns in the data and forecasting in processes of aging by experts in gerontology and geriatrics, expert systems on various aspects of aging process will be developed. Portal users at this stage could be determined as follow:

- i) doctors (managers for interviewers);
- ii) interviewers (persons who gather and enter questionnaires);
- iii) managers.

Portal functions at this stage include several positions:

- a) questionnaires selection according to various criteria;
- b) downloading forms data in .xls format;
- c) questionnaires input, editing, deleting;
- d) get information about interviewers;
- e) get statistics from questionnaires entered into data base.

Prospective users of the portal in the future (additional to initial portal users) are the following subjects:

- a) specialists in the gerontology;
- b) any other medical specialists, practitioners, Interns, residents, graduates;
- c) health facilities;
- d) health and rehabilitation centers;
- e) social services;
- f) elder citizen, their relatives and nurses;
- g) organizations that use volunteer work;
- h) any interested organizations and individuals, including entrepreneurs, merchants, sponsors, patrons, etc;
- i) health insurance;
- j) medical equipment, medical chemistry manufacturers and distributors.

Possible functions of portal in future could be formulated as follow:

- a) ability to self-entry questionnaire by patients or their relatives;
- b) statistical information in the questionnaires from portal database;
- c) ability to analyze;
- d) self-diagnosis;
- e) placement of scientific publications and scientific journals of the medical community;
- f) relation: patient - portal - clinic; information exchange between the patient and the portal, the patient and the hospital, the clinic and the portal;
- g) portal users forum on gerontology or other medical issues.

3. Questionnaire data gathering and storing

Personal data about health of elderly and senior patients in Kazakhstan collecting and storing is a part of the portal. That data required for the further analysis and prediction of the aging process on Kazakhstan territory - information system “questionnaire”. Fig. 1 represents the local system scheme of questionnaires gathering. The information system provides a systematic collection of personal data of patients with subsequent loading into the database.

4. Preliminary results

The results obtained during collecting and entering data allow us to get some results at this stage already.

The priorities in health and social safety at the present stage are health promotion, prevention of disease and disability, the development of rehabilitation.

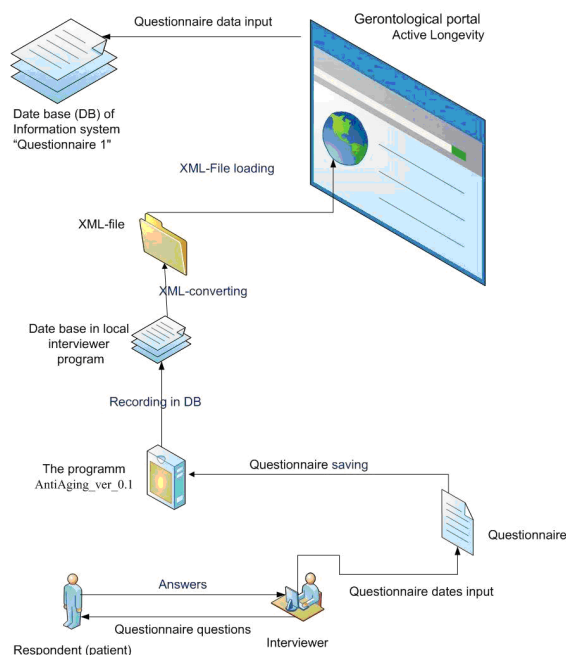


Fig. 1. Process of questionnaire data about health of elderly and senior citizens collecting and storing.

Public health is the most important indicator of society well-being and depends on many factors: the environment, labor conditions, level of satisfaction of population needs in food, clothing and other goods, social goods, leisure, etc. Therefore, to solve health problems is not enough to rely only on budget funding model of medicine. Efforts in this direction may be weakened by insufficient contribution to the health by the population.

The last may be associated with the reluctance to healthy

lifestyles, and on the other hand, the lack of such opportunities in the population, in particular financial.

Cardiovascular diseases (CVD) are considered as one of the major problems in modern world. Therefore the income influence on frequency of cardiovascular diseases was investigated in different age groups.

Income level was evaluated by questioning the respondents letting them to define the level of income, choosing an option from the list:

- “Money is hardly enough sufficient for food.”
- “Money is sufficient for food but for clothing isn’t.”
- “Money is sufficient for food, clothing and small appliances.”
- “Money is sufficient for large household appliances.”
- “Money is sufficient for everything except real estate.”
- “There are no problems with money.”

Mathematical processing of the results was performed using the software package *STATISTICA 8.0* Analysis of the interactions showed that in reality the income of the population and frequency of CVD in groups of men and women has negative correlative relationship. However, at the same time, it was found that the level of income in the studied group has an inverse correlation relationship with age - see Table 1.

Therefore, to eliminate the influence of age factor in the relationship with income and CVD frequency was examined in different age groups. This age group was formed in such a way that, firstly, the age in subgroups with cardiovascular diseases and without them did not differ, secondly, the selected age subgroups was not statistically significant in correlation with age and income. Thus, there were groups in which the incidence of cardiovascular disease and the level of income were not associated with age. The group “Men” was divided into two groups: one group consisted of men from 45 to 55, the other elder than 64 years (Table 2a, 2b).

Table 1. Relation between age, income and CVD (Spearman rank correlation coefficients) in the groups of men and woman (for women $p < 0,05$).

Group		CVD	<i>p</i>	Income	<i>p</i>
Men	Age	0,24	7,8E-10	-0,18	0,004
	CVD			-0,33	2,7E-05
Women	Age	0,26	1,1E-19	-0,17	0,002
	CVD			-0,28	4,7E-08

Table 2. The result of comparisons of income levels and age in different groups: with CVD (group1) and without CVD (group2): a) group of 45-56 year-olds men; b) men over 65; c) women elder 55.

Group		Ranges sum of group1	Ranges sum of group2	<i>p</i> -level	Valid <i>N</i> group1	Valid <i>N</i> group2	Median group1	Median group2
men 45-56	Age	696,0	2154,0	0,10	15	60	50,5	49
	Income	104,0	1436,0	0,004	8	47	2,5	5
men over 65	Age	3097,000	3119,000	0,4	50	49	73	72
	Income	2929,000	1922,000	0,01	44	46	2	3
women elder 55	Age	17195,50	23274,50	0,63	123	161	70	67
	Income	14629,50	12166,50	0,00003	108	123	2	3

Table 3. Frequency of occurrence of cardiovascular diseases in groups with different income levels (expected number are in brackets):
 a) among men elder than 45-55; b) men elder than 65 years;
 c) women elder than 55; d) women elder than 55; e) women elder than 55.

Group	Income level	There are CVD	There are not CVD
a) men elder 45-55	“Money is hardly enough sufficient for food” (1 unit.)	4	1
	The level is higher then “Money is hardly enough sufficient for food”	4	36
b) men elder 65	“Money is hardly enough sufficient for food” (1 unit.)	14	5
	The level is higher then “Money is hardly enough sufficient for food”	35	42
c) women elder 55	“Money is hardly enough sufficient for food”	36,6 % (45)	10,2% (11)
	“Money is sufficient for food and for clothing isn’t”	24,4% (30)	26,9% (29)
	“Money is sufficient for food, clothing and small appliances”	19,5% (24)	30,6% (33)
	“Money is sufficient for large household appliances” +		
	“Money is sufficient for all except estate”	3,2% (4)	5,6% (6)
	“There are no problems with money”	16,3% (20)	26,9% (29)
	Total in group	100% (123)	100% (108)
d) women elder 55	“Money is hardly enough sufficient for food”	24,2% (29,82)	24,2% (26,18)
	“Money is sufficient for food and for clothing isn’t”	25,5% (31,42)	25,5% (27,58)
	“Money is sufficient for food, clothing and small appliances”	24,7% (30,35)	24,7% (26,65)
	“Money is sufficient for large household appliances” +		
	“Money is sufficient for everything except real estate”	4,3% (5,32)	4,3% (4,68)
	“There are no problems with money”	21,2% (26,09)	21,2% (22,91)
Total in group	100% (123)	100% (108)	
e) women elder 55	“Money is hardly enough sufficient for food”	45 (29,82)	11 (26,18)
	The level is higher then “Money is hardly enough sufficient for food”	78 (93,18)	97 (81,82)

Rank criterion of Mann-Whitney was used as a criterion for identifying differences in characteristics levels in sub groups.

Among women only one subgroup followed specified conditions. It included women elder than 55. In the subgroup of women younger than 55 years any statistically significant relationship between the frequency CVD occurrence, age and income was noticed.

Analysis of CVD frequency at different income levels using two-tailed Fisher’s Exact Test revealed statistically significant association between these parameters in groups of men of 45-55 ($p=0,002$) and over 65 years ($p=0,04$). (Table 3a, 3b). In the analysis due to lack of data after checking for homogeneity were combined the data about income, which was higher than “money is hardly enough sufficient for food”.

In the group of women elder than 55 was found correlation between the CVD frequency and income using the criterion χ^2 ($\chi^2 = 23,3, p=0,007$) (Table 3c, 3d).

Using the criterion χ^2 , it was shown that data of income higher than the “money is hardly enough sufficient for food” can be combined ($\chi^2 = 1,44, p=0,98$). Table of dimension 2x2 was the result - see Table 3e.

Analysis of these data showed (Yates correct $\chi^2=20,41, p<0,0001$), that CVD are significantly frequent in a group of women over 55 with incomes lower than “money is hardly enough sufficient for food” than in the group with higher incomes. At the same time there are significantly more women who do not suffer from cardiovascular diseases in the groups with higher incomes.

The analysis of results has shown that for men, as well as for women, frequency of Cardiovascular diseases is significantly higher in groups that evaluate their income as “money is hardly enough sufficient for food”.

All people bring great economic damage. The data of this study has shown that for the normal economic development it is possible and necessary to determine that minimum household income, which will bring less damage to health i.e. the residents should have more opportunities for health maintenance.

Conclusion

The increasing longevity of active life and corresponding increase in expenses in public health services is a new call to the world’s community which forces to start looking for new ways of development of public health services and maintenance of active longevity. Researches, conducted in the developed countries, show necessity of using the information-communication technologies widely, to lower expenses and to raise quality of health services and to create conditions for comfortable life and work at elderly age. New market of services for elderly citizens has large potential consumption of advanced intelligent technologies.

At this stage, the problem of development and research is creation of system for gathering, storing and editing data, obtained from questionnaires of the elderly population of Republic of Kazakhstan. In the future the functions of portal would be as follow:

- a) questionnaire input by patients or their relatives;
- b) advanced statistical information from portal database questionnaires;
- c) ability to analyze;
- d) placement of scientific publications;
- e) scientific journals of the medical community;
- f) information exchange between patients, the portal and clinics, forum for portal users on gerontology or other medical issues.

The preliminary analysis shows possibility of getting serious analytical results at the stage of epidemiological screening. The expansion of research base with inclusion of block of clinical researches allows to expect that the portal will become serious instrument of researches in the field of gerontology in Kazakhstan.

References

1. Resolution of United Nations A/RES/37/51 containing questions of aging. – <http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/37/51&Lang=E&Area=RESOLUTION>, accessed 2012.06.10, principles of United Nations for older persons.
2. In 1991, the General Assembly (by resolution 46/91) adopted the United Nations Principles for Older Persons. – <<http://www.un.org/documents/ga/res/46/a46r091.htm>>, accessed 2012.06.10.
3. Millennium Development Goals: progress towards the health-related Millennium Development Goals. Fact sheet N290, May 2011. – <<http://www.who.int/mediacentre/factsheets/fs290/en/index.html>>, accessed 2012.06.10.
4. Overview of the European strategy in ICT for Ageing Well. September 2009 (report). – ICT for Inclusion, Directorate General for Information Society and Media, European Commission, BU31 01/66, B-1049 Brussels Belgium, <<http://ec.europa.eu/einclusion>>, accessed 2012.06.10.
5. *National Geographic* January (2010).
6. Ambient Assisted Living Roadmap. The European Ambient Assisted Living Innovation Alliance. Edited by Ger van den Broek (Philips Research Healthcare), Filippo Cavallo (Scuola Superiore Sant'Anna), Luca Odetti (Scuola Superiore Sant'Anna), Christian Wehrmann (VDI/VDE-IT). – VDI/VDE-IT AALIANCE Office, Steinplatz 1, 10623 Berlin.
7. ICT & Ageing - Final Report. Edited by Lutz Kubitschke and Kevin Cullen (WRC), January (2010). – Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Oxfordstr. 2, 53111 Bonn, Germany.
8. Stefano Kluzer, Christine Redecker and Clara Centeno. Long-term Care Challenges in an Ageing Society: The Role of ICT and Migrants. Results from a study on England, Germany, Italy and Spain. – JRC European Commission, EUR 24382 EN (2010).