

Preliminary results of the development of portal “Active longevity of Kazakhstan population”

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Abstract

Increasing the duration of active life is one of the most important problems in modern gerontology in the world, including Kazakhstan [1]. First, the solution of these problems is associated with using information and communication technologies (ICT) [2-5]. Gerontological RK portal, which has no analogues in 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 of research results, for getting generalized and personalized information. This paper describes the main elements of the portal and presented 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.

Keywords: gerontology, Kazakhstan population, information technology, cardiovascular diseases.

Work actuality

Gerontological research 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 an increasing in life expectancy. For example, according to European experts in 2060 one third of Europe's population will reach age 80 and elder. At the same time there are great part of single people and people who need intensive medical care in a given layer of the large population. In this regard, the main tasks set forth by the scientific and medical community developed countries are preventing the social isolation of 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 make a range of initiatives by medical, social and technological types of the widespread using of 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 2010 to 2013 only in Europe, public and private investment for research and innovation to improve lives of elder people will be more than 1 billion euros.

Kazakhstan is a developing country, but country's population is also aging. In Kazakhstan, as of 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 is state with accelerated aging, and 25% of elder people are expected in the country according to forecasts for 2050.

Because of this, the problem of prolongation of active longevity, reducing the costs of health care for elder people, increasing their demand in the labor market in old age also stay in front of 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, № 1113.

Economic analysis shows that we need to find ways and new technologies, which with improving the quality of services would be able to reduce costs. Initiatives that are offered in different regions are usually connected with using of information and communication technologies (ICT).

Although the group of elder persons is heterogeneous by education, income, and type of illnesses associated with age, older people are the group of maximum risk in the sense of exclusion from the benefits of the Information Society. Recent study, for example, found that more than 60% of people over 50 in Europe feel that their needs are not taken into account by current ICT services and equipment [4].

Policies and initiatives aimed at promoting conditions and technology for elder people in the information society can achieve a triple purpose:

- facilitating of easy using 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 better, increasing their independence, improving health, increasing the ability to participate in work and be active in society;
- 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;
- because of almost global phenomenon of aging new ICT products and services to ensure the needs of aging society provide an opportunity in corresponding industries to become leaders and exporters in the global market.

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

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

Solution of these problems is connected with application of information-communication technologies (ICT). The work of gerontological portal development is in progress. This portal doesn't have any analog in the countries the former USSR and in neighboring countries.

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 an exchange of experience, the publication of research results, for generalized and personified information reception about elder person 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:

- Doctors (managers for interviewers)
- Interviewers (persons who gather and enter questionnaires)
- Managers

Portal functions at this stage:

1. Questionnaires selection according to various criteria
2. Downloading forms data in .xls format
3. Questionnaires input, editing, deleting
4. Get information about interviewers
5. Get statistics from questionnaires entered into data base

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

- Specialists in the gerontology
- Any other medical specialists, practitioners, Interns, residents, graduate students
- Health facilities
- Sanatorium and rehabilitation centers
- Social services
- Elder citizen, their relatives and carers
- Organizations that use volunteer work
- Any interested organizations and individuals, including entrepreneurs, merchants, sponsors and patrons, etc.
- Health insurance
- Medical equipment and medicines manufacturers and distributors.

Possible functions of portal in future:

- Ability to self-entry questionnaire by patients or their relatives
- Statistical information on the questionnaires from portal database
- Ability to analytics
- Self-diagnosis
- Placement of scientific publications and scientific journal of the medical community
- Relation: patient - portal - clinic. Information exchange between the patient and the portal, the patient and the hospital, the clinic and the portal
- Portal users forum on gerontology or other medical issues

Questionnaire data gathering and store

Personal data about health of elderly and senior patients in Kazakhstan collecting and store 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".

Figure 1. presents the local system scheme of questionnaires gathering.

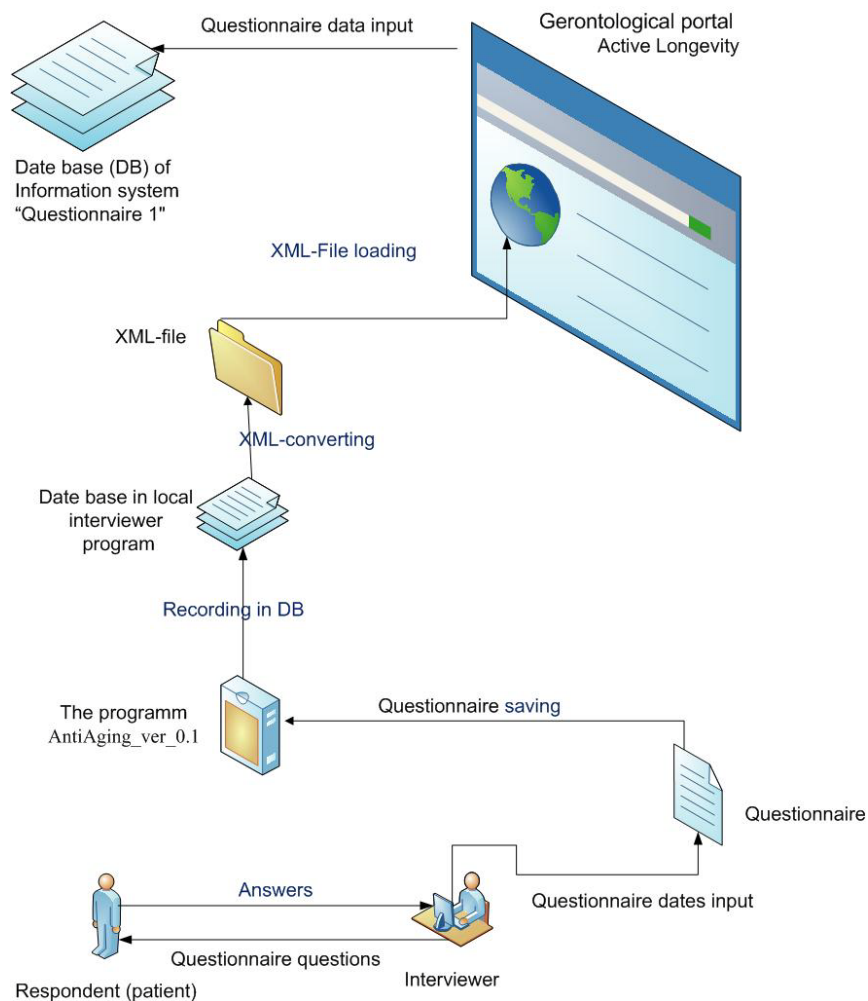


Fig. 1. Process of questionnaire data about health of elderly and senior citizens collecting and storage

The information system provides a systematic collection of personal data of patients with subsequent loading into the database.

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. 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 only budgetary 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 one hand, the reluctance to healthy lifestyles, and on the other hand, the lack of such opportunities in the population, in particular material.

Cardiovascular diseases (CVD) is 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 evaluate with questionnaire where respondent by himself defined his level of income choosing an option from the list:

“Money is hardly enough for food”

"It is enough money for food but for clothing isn't."

"It is enough money for food, clothing and small appliances "

"It is enough money for large household appliances "

"It is enough money for all except estate"

There are no any problems with money

Mathematical processing of the results was performed using the software package «STATISTICA 8.0»

Analysis of the interactions showed that really 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. (Table 1a, 1b).

Table 1a. Relation between age, income and CVD (Spearman rank correlation coefficients) in the group of men

	CVD	Income
Age	0,24 (p=7,8E-10)	-0,18 (p=0,004)
CVD		-0,33 (p=2,7E-05)

Table 1a. Relation between age, income and CVD (Spearman rank correlation coefficients) in the group of women (p<0,05)

	CVD	Income
Age	0,26 (p=1,1E-19)	-0,17 (p=0,002)
CVD		-0,28 (p=4,7E-08)

Therefore, to eliminate the influence of age factor on the relationship of income and CVD frequency was examined in different age groups. For this age group formed in such a way that, firstly, the age in subgroups with cardiovascular diseases and without them did not differ, and, secondly, that in selected age subgroups was not statistically significant correlation of age and income.

Thus were formed 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 then 64 years (Table 2a, 2b)

Table 2a. The result of comparisons of income levels and age in groups of 45-56 years men with CVD (group1) and without CVD (group2)

	Ranges sum of group1	Ranges sum of group2	p-level	Valid N group1	Valid N group2	Median group1	Median group2
Age	696,0	2154,0	0,10	15	60	50,5	49
Income	104,0	1436,0	0,004	8	47	2,5	5

Table 2b. The result of comparisons of income levels and age in groups of men over 65 years with CVD (group1) and without CVD (group2)

	Ranges sum of group1	Ranges sum of group2	p-level	Valid N group1	Valid N group2	Median group1	Median group2
Age	3097,000	3119,000	0,4	50	49	73	72
Income	2929,000	1922,000	0,01	44	46	2	3

Among women only one subgroup followed specified conditions. It included women elder than 55. In the subgroup of women younger than 55 years were no any statistically significant relationship between the frequency CVD occurrence, age and income.

Table 3. The result of comparisons of income levels and age in groups of women elder than 55 years with CVD (group1) and without CVD (group2).

	Ranges sum of group1	Ranges sum of group2	p-level	Valid N group1	Valid N group2	Median group1	Median group2
Age	17195,50	23274,50	0,63	123	161	70	67
Income	14629,50	12166,50	0,00003	108	123	2	3

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

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 for food".

Table 3a. Frequency of occurrence of cardiovascular diseases for men elder than 45-55 in groups with different income levels

Income level	There are CVD	There are not CVD
"Money is hardly enough for food" (1 unit.)	4	1
The level is higher then "Money is hardly enough for food"	4	36

Table 3b. Frequency of diseases occurrence for men elder than 65 years in groups with different income levels.

Income level	There are CVD	There are not CVD
"Money is hardly enough for food" (1 unit.)	14	5
The level is higher then "Money is hardly enough for food"	35	42

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

Table 3a. Frequency of disease occurrence for women elder than 55 in groups with different income levels

Income level	There are CVD	There are not CVD
Money is hardly enough for food	36,6 % (45)	10,2% (11)
It is enough money for food and for clothing isn't	24,4% (30)	26,9% (29)
It is enough money for food, clothing and small appliances	19,5% (24)	30,6% (33)
It is enough money for large household appliances + It is enough money for all except estate	3,2% (4)	5,6% (6)

There are no any problems with money	16,3% (20)	26,9% (29)
Total in group	100% (123)	100% (108)

Table 3a. Frequency of diseases occurrence for women elder than 55 in groups with different income levels: expected numbers

Income level	There are CVD	There are not CVD
Money is hardly enough for food	24,2% (29,82)	24,2% (26,18)
It is enough money for food and for clothing isn't	25,5% (31,42)	25,5% (27,58)
It is enough money for food, clothing and small appliances	24,7% (30,35)	24,7% (26,65)
It is enough money for large household appliances + It is enough money for all except estate	4,3% (5,32)	4,3% (4,68)
There are no any problems with money	21,2% (26,09)	21,2% (22,91)
Total in group	100% (123)	100% (108)

Using the criterion χ^2 , it was shown that data of income higher than the "money is hardly enough for food" can be combined ($\chi^2 = 1,44$, $p = 0,98$). Table 2x2 was the result. (Table 4). Analysis of these data showed (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 for food" than in the group with more high incomes. At the same time there are significantly more women who have no cardiovascular diseases in the groups with higher incomes.

Table 4. Frequency of disease occurrence for women older than 55 in groups with different income levels (expected number are in brackets)

Income level	There are CVD	There are not CVD
"Money is hardly enough for food"	45 (29,82)	11 (26,18)
The level is higher then "Money is hardly enough for food"	78 (93,18)	97 (81,82)

The analysis of results has shown that for men, just as for women, frequency of Cardiovascular diseases significantly higher in group that evaluates their income as "money is hardly enough for food".

"Sick" people brings great economic damage. The data of this study showed that for the normal economic development is possible and necessary to determine that minimum household income, which is applied least damage to health, that is, the residents have opportunities for health maintenance.

Conclusion

The increasing longevity of active life and corresponding increasing in expenses at public health services is a new call to world community which forces to search new ways of development of public health services and maintenance of active longevity. Researches, conducted in the developed countries, show necessity of using of 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, store and editing data, obtained from questionnaires of the elderly population of Republic of Kazakhstan. In the future functions of portal would be: questionnaire input by patients or their relatives; advanced statistical information from portal database questionnaires; ability to analytics; placement of scientific publications; scientific journal of the medical community; 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 stage of epidemiological screening. The expansion of research base with inclusion of block of clinical researches allows to expect that the portal becomes serious instrument of researches in the field of gerontology in Kazakhstan.

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