ISSN 2412 - 3692

CAJMSE

CENTRAL ASIAN JOURNAL OF MEDICAL SCIENCE AND EDUCATION

Volume 1 | Number 1 (October - December) | 2015

Central Asian Journal of Medical Science and Education (CAJMSE) is an international peer-reviewed open-access journal that provides an integrated view of modern medicine.CAJMSE is published quarterly and considers original articles, reviews, lectures, recommendations to practitioners and case reports in English relating to all aspects of medicine, pharmacy and pharmacology, dentistry, public health and education.

INSTRUCTIONS FOR AUTHORS

Editorial policy

Central Asian Journal of Medical Science and Education (CAJMSE) is an international peer-reviewed open-access journal that provides an integrated view of modern medicine. CAJMSE is published quarterly and considers original articles, reviews, lectures, recommendations to practitioners and case reports in English relating to all aspects of medicine, pharmacy and pharmacology, dentistry, public health and education.

There are no processing and publication charges for authors. The aim of the journal is broad coverage of scientific achievements in the field of health and medical education, and the formation of scientific and clinical outlook of the target audience.

All manuscripts are subject to peer review by at least two experts and internal checks by the Journal's responsible editors. Manuscripts submitted to the Journal should not be under simultaneous evaluation elsewhere.

How to submit your paper?

Manuscript submission to CAJMSE journal is free.

1. It is necessary to review the information for authors at the following link: cajmse.kaznmu.kz

2. Send your article and information about the author to the address of the editorial board: cajmse@kaznmu.kz Editors process manuscripts sent by emails only.

3. You should submit a Cover letter. The authors should present in the Cover letter that the materials, for publication in CAJMSE, are unique and have not been submitted in other journals. The Cover letter should explain why your materials should be published in CAJMSE, and why it is suitable and necessary for publication in our journal.

4. Inclusion of illustrations (photographs, graphs, diagrams etc) is a prerequisite for publication. Digital photography files should have a resolution of at least 300 dpi and be at least 107 mm wide.

5. After completing the review, you will receive a notification about the results per e-mail within one month.

General guidelines

• Upon submission of a manuscript, the authors will be asked to choose any subject area from the list provided that is closely related to the topic of the manuscript. The manuscript will be considered for publishing under the chosen section of the Journal.
• Manuscripts should be submitted in Doc/Docx formats.
• The word count limits are provided below.
• Patients' or their close relatives signed consent forms are required for processing case reports. Further guidance is available at: http://www.care-statement.org/
• Reports on animal studies should confirm to the ARRIVE (Animal Research: Reporting of In Vivo Experiments) guidelines: https://www.nc3rs.org.uk/arrive-guidelines
• Narrative reviews should be written and structured in accordance with the following guidance: http://link.springer.com/article/10.1007%2Fs00296-011-1999-3
• Authors of systematic reviews are advised to consult the PRISMA statement: http://www.prisma-statement.org/

Authorship criteria

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

All those designated as authors should meet all four criteria, and all who meet the four criteria should be identified as authors.

For more detailed information please have a look at the following guidance from the International Committee of Medical Journal Editors: http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html

Cover letter

Corresponding author should submit a cover letter stating that:

1) the submitted manuscript has not been simultaneously submitted to any other journal and is not under evaluation for publishing elsewhere, is not accepted or published in another journal;
2) no part of the text and graphics has not been copied from other sources without official permission.
3) Use the cover letter to explain why your paper should be published in CAJMSE rather than elsewhere (eg, a specialty journal)

Cover letter should be signed by all authors and submitted in pdf format.

If these requirements are not fulfilled, manuscripts will not be considered by editors.

Title page

The title page must contain the following information:

- Title of the article;
- Full name, e-mail, department, institution, city, and country of all authors.

It is desirable to register with ORCID at http://orcid.org/ and submit each co-author's permanent ORCID ID along with the manuscript.

SPECIFIC REQUIREMENTS

Original papers

Original papers represent a substantive and finished research laboratory or clinical work, which is approved by the authors' institution or local ethics committee. Original papers should not exceed 3000 words; articles that exceed this word limit may be returned for a revision prior to the peer review. Original papers should be properly structured and divided into the following sections:

Abstract

Abstract should contain up to 300 words, summarizing the covered issue, research methods employed, obtained main results, and concrete conclusions (Background, Methods, Results, Conclusion).

Keywords
Authors are advised to choose no more than five relevant keywords from the MeSH thesaurus of PubMed (http://www.ncbi.nlm.nih.gov/mesh/). These should be placed after Abstract.

Introduction
The Introduction should contain up to 400 words and justify novelty and purpose of the study.

Methods
The Methods should contain up to 650 words and describe all research tests employed. Materials used, operating protocols, reproducibility of all the tests should be reported. Dates and place of the execution of the study have to be mentioned. Describing subjects' enrollment in the study and referring to an ethics approval protocol are mandatory. Statistical tests should be clearly described at the end of this section.

Results
The Results should contain up to 700 words. These should be reported in logical sequence and in accordance with methods presented in the Methods. Discussion of the results is not necessary in this section. Findings should be reported in SI units. Please present the main findings with P values, 95% Confidence Internals, values of Odds Ratios, etc. Still and moving graphical materials should be properly edited and presented in an appropriate format.

Discussion and conclusion
The Discussion and Conclusion should contain up to 1000 words. This section should compare the obtained data with relevant literature sources to justify the novelty and practical implications of the study. Limitations of the study should be clearly reported. Conclusion should be based on the obtained results and be concrete.

Acknowledgments
Individuals who contribute to the study but do not satisfy the authorship criteria above should be listed in the Acknowledgments. The source of financial support and any relation to sponsors, including pharmaceutical agencies should be reported. Please find more information on conflicts of interest at:
http://www.icmje.org/conflicts-of-interest/

References
The number of references should be about 30-40 for original research papers. All references should be listed in the article in accordance with their consecutive numbers cited in the text.

Examples of formatting references:

1. Author AA, Author BB, Author, CC. Title of article. Title of Journal. 2005;10(2):49-53.
2. Title of a web resource. URL link [date of access – March 28, 2015].

Case reports

Case reports should inform about unique and educational case observations. Case reports should include the following aspects: clinical history, examinations, diagnosis, results, and a brief literature review. The main aim of the case reports is to inform about unusual course of a disease, side effects of drug therapies, and traditional treatment modalities.

Case report should not exceed 3000 words. Case report should be presented in the following sections:

Abstract
The Abstract should contain up to 200 words, presenting the rationale for the case report, concerns of the patient, diagnoses, interventions (including prevention and lifestyle), outcomes, main lessons learned from the case under subheadings: Background, Case, and Conclusion.

Keywords
No more than five keywords selected from the MeSH of PubMed. These should be placed after the Abstract.

Introduction
Briefly summarize the background and context of the case report.

Case history
Summarize the patient's presenting concerns along with key data and demographic information.

Clinical Findings:

1. Medical, family, and psychosocial history (including lifestyle and genetic information);
2. Pertinent co-morbidities and interventions;
3. Physical examination focused on the important findings including diagnostic testing.

Diagnostic Focus and Assessment:

1. Diagnostic results (testing, imaging, questionnaires, referrals);
2. Diagnostic challenges;
3. Diagnostic reasoning;
4. Relevant prognostic characteristics (such as staging).

Intervention
Summarize recommendations and interventions (pharmacologic, surgical, lifestyle) and how they were administered (dosage, strength, etc.)

Outcome
Summarize the clinical course of this case. How the patient's adherence to the intervention was assessed and whether there were adverse events? Summarize patient-reported outcomes and follow-up diagnostic testing.

Discussion
Summarize the strengths and limitations of the case report. Include references to the scientific and medical literature. How did you arrive at your conclusions and how might these results apply to other patients? What are the «take-away» messages?

Informed Consent
The patient should provide informed consent for this case report.

Acknowledgments
Acknowledge contributions of all those who do not meet the authorship criteria. The source of financial support and pharma industry affiliations of all those involved must be stated.

References

The number of references should be about 15-30. All used references should be listed in the article in accordance with their number.

Example of references:

Author AA, Author BB, Author, CC. Title of article.
Title of Journal. 2005;10(2):49-53.

Reviews

Reviews should cover actually topics of current medicine. Reviews focused on giving medical students new and interesting information from different areas of medicine. Reviews should not exceed 3000 words. Articles that exceed this word limit may be returned for revision before peer-review. Reviews should be presented in the following sections:

1) The abstract should be up to 200 words.
2) Up to five keywords (selected from the MeSH of PubMed).
3) The manuscript should contain 6 section (Introduction, Main body, Conclusion, Acknowledgments, References).
4) References number is up to 100.
5) Illustration and tables (up to 4).

Checking for plagiarism

All submissions to CAJMSE will be checked for text copying through AdvegoPlagiatus software. Our editorial team expects that is submission is original, free of any copied text or graphics, and written in a way that improves medical students thinking and professional orientation.

Patient inform consent

For case reports, authors should present “Patient Inform Consent”. Please read the following paragraphs:

1. Consents, permissions and releases should include images of patients or volunteers, without personal information, in order to comply with all applicable laws and ethnic positions.
2. If the patient or volunteer are minor, it is necessary to submit the consent from their parents or guardians.

"Science knows no country because knowledge belongs to humanity, and is the torch which illuminates the world.Science is the highest personification of the nation because that nation will remain the first which carries the furthest the works of thought and intelligence"
Louis Pasteur

The President of Kazakhstan, Nursultan Nazarbayev recently addressed the people of his nation in a speech titled "Socioeconomic Modernization: Our Top Priority for the Development of Kazakhstan." The address focused on the importance of strengthening scientific research and building a more efficient platform for the government to interact with business and research facilities in a manner that encourages progress in innovative technologies.

With the explicit goal of lifting Kazakhstan to a level of international leaders in the medical science field, Kazakhstan plans on introducing new technologies to the market, broadening scientific research, defining federal and regional goals for improving medical science education and research, and investing the proper resources to ensure success. To accomplish these goals, the President has encouraged the scientific community to liaise with the academic community, general population, and even other countries, and conduct open discussions and exchange views, notably through the medium of medical journals.

This year, the Asfendiyarov Kazakh National Medical University (KazNMU) celebrates the 85th anniversary. This is a big and important date, which allows to take stock of activities in medical training and academic performance, as well as to identify common issues that need to be discussed from a scientific point of view.

And on the eve of such a significant date, we are pleased to report about the first issue of a new international scientific journal «Central Asian Journal of Medical Science and Education».

This journal is aimed to the country's of Central Asian region, which will raise the problem of medical education and medical science, and to communicate to a wider audience. The journal will be published in English in order to share this knowledge to the world community.

The mission of the journal is to strengthen the brand of KazNMU within scientific and academic community, and engaging to cooperate with talented local and foreign scientists. «CAJMSE» is intended to promote up-to-date knowledge of medical science and education, both in Kazakhstan and abroad.

We would like to welcome the first authors who enthusiastically responded to publication of their achievements in our first journal edition. And, of course, we invite researchers and scientists to active cooperation, partnership and peer reviewing of our upcoming publications. Only by joint efforts we will be able to develop common ground in medical education and raise new areas of medical science.
Therefore, we invite you to an active discussion on the pages of the journal, and beyond.

Editor-In-Chief
Aikan Akanov

THE EFFICACY APPLICATION OF COMBINATION AS AN ACTOPROTECTOR AND ANTIDEPRESSANT IN THE TREATMENT OF LOCOMOTOR DISORDERS IN THE ELDERLY

Ilnitski Andrei N. [1]
http://orcid.org/0000-0002-1090-4850
E-mail: a-ilnitski@yandex.ru

Prashchayeu Kiryl I. [2]
http://orcid.org/0000-0002-5436-9431
E-mail: prashchayeu@gmail.com

Nemykin Oleg N. [3]
http://orcid.org/0000-0001-7663-9976

Litvinov Andrei E. [4]
http://orcid.org/0000-0003-0228-5225

[1] Researching Medical Center "Gerontology" (Moscow, Russia), Vice-director, Chairman of Department of Clinical Gerontology, MD, PhD, DSc, Prof. / Belarusian Association of Gerontology & Geriatrics, Chairman
[2] Researching Medical Center "Gerontology" (Moscow, Russia), Director, MD, PhD, DSc, Prof. / The open Institute of Human and Nature (Lithuania, Vilnius)
[3] National Research University 'Belgorod State University' (Belgorod, Russia), Department of Medicine, resident, MD
[4] Belgorod Regional Hospital for elders (Belgorod, Russia), Chairman of Department of Neurology, MD

ASTRACT

OBJECTIVE

Here are the results of original research on the effectiveness if added to standard therapy an actoprotector (Actovegin) and antidepressant (Fluvoxamine) in elderly patients with comorbidity (as the pathology of the central nervous system and locomotor disorders).

METHODS

We are examined per 63 patients at a mean age 67 years, which diagnosed comorbidity as the dyscirculatory encephalopathy II stage with ataxic syndrome, mild depressive episode, I-II radiographic stage osteoarthrosis of hip and knee joints.

RESULTS

In the basic group after exposure therapy there was a decrease content of interleukin and tumor necrosis factor-α in blood. There improved results in the 6-minute walk test, increased motivation to improve their self-state. At the dynamics of Hamilton Depression Scale results there are decreased intensity on a number of parameters: «depressive mood», «sense of guilt», «insomnia», «psychic anxiety», «somatic anxiety», «hypochondria», «paranoid symptoms», «obsessive symptoms» and increased «activity». Meanwhile, in the control group no significant changes were observed.

CONCLUSION

The application a combination of an antidepressant and actoprotector promotes correction of pro-inflammatory changes. First, this approach can reduces expressiveness of depression. Secondly, it allows decreasing the involutory age-related changes in muscle tissue the arising from the immune inflammation. Addition to conventional therapy as a combination of an antidepressant and actoprotector has proved significantly greater antidepressive effect compared to standard therapy. Also, it significantly enhances the motivation of older people to improve their self physical condition. This applies primarily to the locomotor function.

KEYWORDS: Actoprotector, Antidepressant, Actovegin, Fluvoxamine, Depression, Locomotor, Disorder, Elderly

INTRODUCTION

In the last years more and more widely using in geriatrics finds a group of drugs called actoprotectors, which enhance physical performance and endurance at their age-related decline [1, 2]. At application in elderly actoprotectors have a number of very valuable properties, which allow inhibiting the natural age-involutive processes. Specifically, the actoprotectors are having anti-hypoxic effect and them capable to improve long-term memory. Also they improve exercise capacity and have an anti-asthenic effect. All these properties can have an importance in arresting geriatric syndrome such as locomotor disorder [3, 4].

According to the data of several authors, often requires the use of antidepressants in the elderly due to the fact that the breach of movement associated with depressivion, decreased motivation for improvement, dysfunctional psychological background. In this context the elimination of these conditions which accompany locomotor disorders, allows more efficient recover this function in the elderly [5, 6].

OBJECTIVE

The aim of the study is to examine the effectiveness of complex application actoprotector Actovegin and antidepressant Fluvoxamine in the treatment of elderly patients with combined pathology of the central nervous system and locomotor disorders.

METHODS

General notes. This study was a prospective, open-label study, it used the technique of double-blind control.

During the research has been studied the effectiveness of addition to the standard treatment of the complex as an actoprotector (Actovegin) and antidepressant (Fluvoxamine) in elderly patients with combined pathology of the central nervous system and locomotor system.

The study included 32 patients (control group) at a mean age 67,1+0,8 years, which has a combination of dyscirculatory encephalopathy stage II with a

mild case of ataxic syndrome and osteoarthritis of the hip and knee joints, all of which led to the development locomotor dysfunction and the 31 patients of basic group (mean age 67,2+0,7 years), who received Actovegin and Fluvoxamine in addition to conventional therapy.

Inclusion criteria is a combined pathology:
-the dyscirculatory encephalopathy stage II with ataxic syndrome,
-mild depressive episode,
-I-II radiographic stage osteoarthrosis of hip and knee joints with I-II degree-dysfunction of these joints.

Exclusionary criteria are includes the presence of:
-other classes of severity of this pathology,
-other diseases, which cause restriction of mobility (for instance, a chronic cardiac insufficiency as III or higher functional class (NYHA-classification), a chronic respiratory failure-severe),
-stable residual post-stroke changes or consequences of other pathology, accompanied by locomotor disfunction,
-a rough mental disorders that leads to the unavailable of a productive contact with patient,
-acute somatic diseases.

Diagnostic criteria
Diagnostics of osteoarthrosis of the joints was based on such evidence:
-restriction of mobility the affected joints and painfulness in their motion,
-articular crepitus,
-myofibrosis zones in the muscles that surround the joints; in some cases, the presence of synovitis,
-the absence of systemic manifestations,
-at the X-ray examination – the joint space narrowing, the areas of subchondral sclerosis with cystoid radiolucency.

As diagnostic criteria of the dyscirculatory encephalopathy were used:
-typical complaints of the patients (depressed mood, fluctuation of the mood, dizziness, tinnitus, joint pain, and pain along the spine),
-neurological examination data (asymmetry of tendon-periosteal reflexes, ataxic syndrome).
-for the confirmation of diagnosis we used a neurovisualisation methods, particularly magnetic resonance imaging (identified: leukoaraiosis, cerebral atrophy, lacunar infarctions).

At the mild depression diagnostics we used a number of criteria, which match those of criteria under the section F32.0 of International Classification of Diseases, 10-th Edition [7].

Characteristics of the treatment. Patients of the basic group and the control group received conventional therapy, which is used cerebroangioregulators, disaggregants, anti-atherosclerotic drugs for the specified multimorbid complex. Also we used the nonsteroidal anti-inflammatory drugs for pain syndrome, that accompanied of articular pathology.

In our research 2 drugs was added to the standard therapy: an antidepressant and actoprotector. As the antidepressant added to the therapy, patients received the Fluvoxamine (trade name - Fevarin, producer «Abbott Biologicals SAS», France). Fevarin is a selective serotonin reuptake inhibitor. The drug has antidepressive effect with a distinct component of antianxiety. Fluvoxamine was appointed in tablet form at a dosage of 50 mg 1 time a day for three months.
As actoprotector added to the therapy, was prescribed the Actovegin (producer 'Nycomed GmbH', Germany). First this drug was appointed by injection in a dose of 5ml (200 mg) to 200.0 ml of solution as an infusion for 10 days. In the following patients received tableted Actovegin for 2 weeks.

The test of efficiency in therapeutic complex using based on the assessment of:
-the neuroimmunoendocrine proinflammatory reaction status (definition of levels proinflammatory interleukins and tumor necrosis factor-α (TNF-α);
-the physical activity status (6-minutes walk distance test);
-the psychological background (the questionnaire «Recovery locus of control»);
-intensity of depression (Hamilton Depression Rating Scale).

The neuroimmunoendocrine changes determined the content of proinflammatory cytokines (interleukins 1, 2, 6 (IL-1, IL-2, IL-6); TNF-α) by immunoenzyme method using a test-systems based on a photometer «Multiskan Plus» at a wavelength of 450 nm.

The state of physical activity detected by 6-minutes walk distance test, which was to determine the distance that the patient was able to walk for six minutes, including rest periods due to the illness.

Assessment of psychological status was performed by using of the questionnaire «Recovery locus of control». The questionnaire consists of nine items, each of which is in a utterance, the extent to which the consenting of the patient must express in points: «totally agree» (4 points), «agree» (3 points), «do not know» (2 points), «disagree « (1 point) and «totally disagree « (0 points) in the right-questions, and vice versa - in a «mirror» questions.

The questionnaire includes the following items: «what would happen to me in the future depends on myself, not from what other people have done for me», «a real changes depends on what I doing to help myself», «I am sure, that I will do everything possible to achieve the most complete recovery, regardless of circumstances», «the achieving of improvement - now it is a matter of my own determination, but is not someone else will», «it does not matter how much help I get - eventually, it needs to make own efforts», «it is often, that better to wait and to see what will happen», «my own efforts are not very important, in fact, my restore depends on the people around», «my own contribution to my recovery does not have to be very large», «I nearly do not control (or not in control) of the improving process».

When applying this questionnaire the total point can range from 0 to 36, the higher the score, the higher the level of motivation to overcome the health problems we have in this patient.

Depression severity we determined using the Hamilton Depression Rating Scale, which is one of the most commonly used scales to assess the severity of depression and determine the dynamics of the patient with already established diagnosis in the process of treatment. In the version of the scale, which we applied contains 21 questions; each question is offered from 3 to 5 choices. The questions cover various issues: depressed mood (sadness, hopelessness, helplessness, feelings of inferiority); sense of guilt; suicidal intent; early, middle or late insomnia; working ability and activity; retardation (slowness of thinking and speech, impaired ability to concentrate, decreased motor activity; agitation; psychic anxiety; somatic anxiety (physiological symptoms of anxiety: gastrointestinal - dry mouth, flatulence, indigestion, diarrhea, belching; cardiovascular - palpitations; headaches , breathing - shortness of breath, hyperventilation, frequent urination, increased sweating), gastrointestinal somatic symptoms, general somatic symptoms; sexual disorders; hypochondria; weight loss; a critical attitude to the disease; diurnal fluctuations of the mood; depersonalization and derealization (feeling of unreality); paranoid symptoms; obsessive and compulsive symptoms.

When interpreting the results, we took into account that the total point can range from 0 (no depression) to 52, which corresponds to an extreme expression degree of depressive symptoms. The total final point from 0 to 6 is regarded as the absence of a depressive episode, 7-15 points - the presence of «mild depressive episode», 16 points or higher - as «severe depressive episode».

Statistics. We used assessment method significance differences between two sets of data by applying the Student t-test. The difference indices are a significant at t □ 2, in this case – $p < 0.05$. In conducting statistical processing, the data were introduced into a spreadsheet «Excel».

Mathematical and statistical processing performed using the program «Statgraphics plus for Windows», version 7.0.

Other notes. This study was reviewed and received admission the Ethics Committee «Researching Medical Center» Gerontology» (No. 2011-11-1, dated 18 November 2011). A part of the study results were published in the Russian-language magazine «Fundamental Research».

RESULTS

The neuroimmunoendocrine changes. We found that the addition of a combination of Actovegin and Fevarin to traditional therapy resulted in significant anti-inflammatory effect. In particular, we have shown the reduction a content of IL-1, IL-2, IL-6 and TNF-α level in blood in a basic

Table 1. Dynamics of pro-inflammatory status in therapy

Index	Control group		Basic group	
	Before	After	Before	After
IL-1 (pg/ml)	345,2±9,5	347,1±9,7	346,9±9,6	305,8±9,3[a]
IL-2 (pg/ml)	152,6±9,3	153,3±9,4	150,6±9,5	111,3±9,1[a]
IL-6 (pg/ml)	4,2±0,3	4,2±0,2	4,1±0,3	3,1±0,2[a]
TNF-α (pg/ml)	138,4±9,0	139,3±9,1	137,6±9,2	107,7±7,8[a]

a p<0,05 in the dynamics of therapy in the basic group and between a control and basic groups.

IL=Interleukin; TNF-α=Tumor necrosis factor-α.

group. It is noticed, no significant changes of content of these signaling-molecules in the control group (I).

The dynamics of clinical efficiency. In the study has been proven a higher clinical effect of the combination of additional actoprotector and antidepressant than an application of only conventional therapy. Thus, in the control group, the distance that an elderly patient was able to go for six minutes, before the start of therapy corresponded to 456,6+32,6 meters (m) and after the treatment - 564,5+31,7 m. The distance, which patients in the basic group was able to go before the therapy, was equal to 454,7+30,7 m; after the treatment it was significantly higher value of the index in the dynamics and compared to a control group (497,7+30,8 m); $p<0,05$ (Figure 1).

Figure 1. Dynamics of test results 6-minutes walk distance under influence of simple traditional therapy or adding to it a combination of an antidepressant and actoprotector.

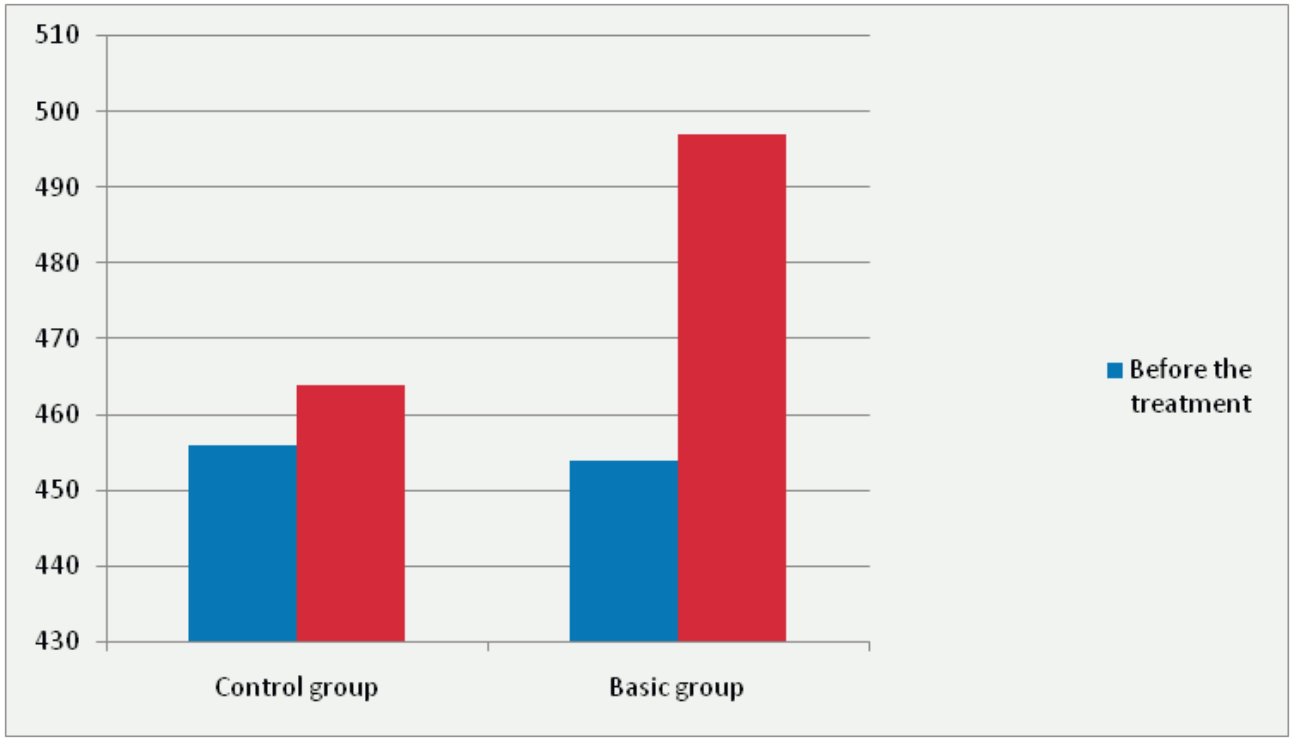


Table 2. The dynamics of motivation to improve of the locomotor function under influence the complex treatment.

Items	Control group		Basic group	
	Before	After	Before	After
1. "What would happen to me in the future depends on myself, not from what other people have done for me"	2,8±0,2	2,8±0,1	2,8±0,1	3,2±0,1 [a]
2. "A real changes depends on what I doing to help myself"	2,8±0,1	2,9±0,02	2,8±0,2	3,4±0,1 [a]
3. "I am sure, that I will do everything possible to achieve the most complete recovery, regardless of circumstances"	2,9±0,1	2,8±0,2	3,0±0,2	3,7±0,1 [a]
4. "The achieving of improvement - now it is a matter of my own determination, but is not someone else will"	2,7±0,1	2,8±0,2	2,7±0,2	3,7±0,2 [a]
5. "It does not matter how much help I get - eventually, it needs to make own efforts"	2,7±0,2	2,6±0,3	2,6±0,2	3,4±0,2 [a]
6. "It is often, that better to wait and to see what will happen"	2,9±0,2	2,9±0,3	2,9±0,1	3,4±0,2 [a]
7. "My own efforts are not very important, in fact, my restore depends on the people around"	2,7±0,2	2,7±0,1	2,8±0,1	3,6±0,2 [a]

8. "My own contribution to my recovery does not have to be very large"	2,8±0,1	2,7±0,2	2,8±0,2	3,5±0,1 [a]
9. "I nearly do not control (or not in control) of the improving process"	2,8±0,3	2,9±0,3	2,9±0,2	3,7±0,1 [a]
10. Summary point	**25,2±0,2**	**25,3±0,3**	**25,4±0,2**	**30,5±0,2 [a]**
a p<0,05 in the dynamics of therapy in the basic group and between a control and basic groups.				

The dynamics of motivation to improve self-state. The dynamics of motivation on improve the state was assessed on the basis of inventory «Recovery locus of control». In this case, we have found a significant increase in points for all positions in the basic group after the combination treatment (p<0,05). In the control group were found no significant points change, including the summary point (II).

The dynamics of depression. In assessing the level of depression in the dynamics of therapy on the Hamilton scale, we obtained the following results (III).

Before the start of experiment in the control group and basic group are scores were the similar at all scales. In the control group after the treatment no significant changes of these parameters has not been registered. In the basic group there was a significant decrease of points in the number of scales, such as «depressed mood», «sense of guilt», «insomnia», «psychic anxiety», «somatic anxiety», «hypochondria», «paranoid symptoms» and «obsessive symptoms». Been registered a significant increase in points at the parameter «activity». No changes in scales – «suicidal intent», «retardation» and «agitation».

In general, it should be noted that before the start of therapy total score in both groups had no significant differences and it was described as «mild depressive episode». After the end of the observation in the basic group there was a significant smoothing of depressive symptoms, while in the control group, these patterns have been received.

DISCUSSION AND CONCLUSION

According to different authors motor function is an integral and depends not only on the state of the locomotor apparatus, but also the emotional and mental status of elderly [8, 9]. A considerable role here belongs to depression.

Systemic impact of depression on the body quite versatile. In the initial stages of the disorder is a key the behavioral aspect when the constantly depressed mood, pessimism, focus on their painful experiences lead to hypochondriacal self-observation with a tendency to decrease the self-loading [10]. The changing a life position leads to rejection of the professional activity, the narrowing a circle of friends. Result is that there is an infringement of

Table 3. The dynamics of depression under influence of combination therapy (in points).

Scales	Control group		Basic group	
	Before	After	Before	After
Depressed mood	1,3±0,01	1,3±0,02	1,3±0,02	0,6±0,02[a]
Sense of guilt	1,2±0,02	1,1±0,03	1,2±0,01	0,6±0,01[a]
Suicidal intent	0,4±0,02	0,4±0,01	0,5±0,02	0,5±0,01
Insomnia	1,1±0,01	1,1±0,02	1,1±0,02	0,6±0,01[a]
Activity	1,4±0,01	1,5±0,02	1,5±0,02	1,8±0,01[a]
Retardation	1,1±0,01	1,1±0,02	1,1±0,02	1,0±0,01
Agitation	1,0±0,01	1,1±0,02	1,1±0,01	1,1±0,01
Psychic anxiety	1,9±0,01	1,9±0,02	1,9±0,01	0,9±0,02[a]
Somatic anxiety	1,8±0,02	1,9±0,02	1,8±0,01	0,9±0,02[a]
Hypochondria	1,4±0,01	1,3±0,02	1,4±0,02	0,7±0,01[a]
Paranoid symptoms	1,4±0,01	1,3±0,03	1,4±0,02	0,7±0,01[a]
Obsessive symptoms	1,3±0,01	1,2±0,03	1,3±0,02	0,6±0,02[a]
Summary point	**9,5±0,3**	**9,4±0,4**	**9,4±0,2**	**6,0±0,3[a]**
a p<0,05 in the dynamics of therapy in the basic group and between a control and basic groups.				

communicative capabilities of patients and reduced compliance to treatment. Together, this results in the restriction of motor activity [11].

In addition, the presence of depression, reduced motivation to recovery, age-related and degenerative diseases of the musculoskeletal system are have many similarities at the level of the signal intermolecular interactions. In elderly peoples circulating signaling molecules with distant effect and neurotransmitters (neuropeptides) with a local action are involved in the regulation of the immune response, in particular the presentation of antigen, antibody production, regulation of the activity of lymphocytes, the proliferation, cytokine production, include the regulation of types of immune response (Th1 or Th2). In the development of inflammation is the activation of the stress-systems and induction the immune response by T2-type. Its helps protect the body from overload proinflammatory cytokines. In some instances under the influence of stress hormones activates the hypothalamic-pituitary axis, triggers inflammation, increased production of IL-1, IL-6, IL-8, IL-18, C-reactive protein and TNF-α. This is accompanied by an increased «local» inflammatory background, which may have a pathogenetic role in the development of allergic diseases, autoimmune diseases, obesity, sarcopenia, vascular lesions, atherosclerosis and depression [12, 13, 14].

It is important, that sarcopenia has a special significance at the locomotor function deterioration. In reducing the of muscle mass attaches great importance to reduce the level of somatotropic hormone, somatomedin C, estrogens and testosterone, which is associated with increased activity of proinflammatory cytokines. It is proved that the processes of muscular age-atrophy associated with the development of age-proinflammatory status (particularly by IL-1 and IL-6), and increased production of C-reactive protein. Proinflammatory activation, age-hypoxia of the muscle tissue is leads to a reduction of muscle function as a protein depot [15].

Muscle tissue is the largest protein depot in organism, and it has certain specificity, as only there was found systems of proteolysis such as ubiquinone-proteasomal system and caspase-3, which splits actin and myosin into smaller fragments. With increasing age, mainly due to hormonal influences, there is an imbalance between anabolic and catabolic processes. In particular, the decline in anabolic hormones (somatomedin C, testosterone) inhibits anabolism with simultaneous activation of catabolic homeostasis ways. It is interesting to note that skeletal muscles is the organ, which produce somatomedin C, and it's volume in the system depends on the level of physical activity. Than higher the level of physical activity, the higher the volume of somatomedin C. Is also discussed the role of physical activity in the production of growth factor 1 (IGF-1) that is required for activation of stem cells of muscle tissue (satellite cells), providing it's volume. In complex this leads to decrease of the locomotor function [16, 17].

Recent data indicate that, under the influence of proinflammatory activation and reduce the volume of the locomotor function is disturbed vasomotor reactivity of the cerebral vessels, that is an important mechanism for maintaining the stability of cerebral perfusion. In depression vasomotor reactivity of cerebral vessels significantly reduced. Thus, the study of cerebral perfusion using single-photon emission computed tomography showed an obvious change (reduction) of blood flow in the left frontal lobe in elderly patients with major depressive disorder. This change was reversible and returned to normal after the disappearance of symptoms of depression [18, 19]. The listed data by other authors agreed with the results of our studies that indicate that the addition to conventional therapy antidepressant and actoprotector improves locomotor function as a result of reduced neuroimmunoendocrine proinflammatory activity, and the related positive clinical dynamics.

The application a combination of an antidepressant and actoprotector promotes correction of pro-inflammatory changes. First, this approach can reduces expressiveness of depression. Secondly, it allows decreasing the involutory age-related changes in muscle tissue the arising from the immune inflammation.

In the treatment of the elderly is important to correct of their psychological state, relief of depressive events, increasing decline in motivation to improve their eigenstate. Addition to conventional therapy as a combination of an antidepressant and actoprotector has proved significantly greater antidepressive effect compared to standard therapy. Also, it significantly enhances the motivation of older people to improve their self physical condition. This applies primarily to the locomotor function.

REFERENCES

1. Kiecolt-Glaser JK, Belury MA, Porter K, et al. Depressive symptoms, omega-6: omega-3 fatty acids, and inflammation in older adults. Psychosom Med. 2007 Apr; 69-33: 217-224.
2. Yang K, Xie G, Zhang Z, et al. Levels of serum interleukin (IL-6), IL-1beta, tumour necrosis factor-alpha and leptin and their correlation in depression. Aust N Z J Psychiatry. 2007 Mar; 41-3:

266-273.
3. Boggatz T, Dassen T. Ageing, care dependency, and care for older people in Egypt: a review of the literature. J Clin Nurs. 2005 Sep; 14-8B: 56-63.
4. Jonsson AL, Moller A, Grimby G. Managing occupations in everyday life to achieve adaptation. Am J Occup Ther. 2009 Jul-Aug; 53-4: 353-62.
5. Macko RF, Benvenuti F, Stanhope S, et al. Adaptive physical activity improves mobility function and quality of life in chronic hemiparesis. J Rehabil Res Dev. 2008; 45-2: 323-8.
6. Elenkov IJ. Neurohormonal-cytokine interactions: Implications for inflammation, common human diseases and well-being. Neurochem Int. 2008 Jan; 52-1-2: 40-51.
7. World Health Organization. The ICD 10 Classification of Mental and Behavioural Disorders: Diagnostic criteria for research. Geneva: WHO, 1993. Available from: http://www.who.int/classifications/icd/en/GRNBOOK.pdf [Accessed on Feb 20 2013].
8. Elon RD. Perspectives on the future of geriatric medicine. J Am Med Dir Assoc. 2006 Mar; 7-3: 197-200.
9. van den Biggelaar AH, Gussekloo J, de Craen AJ, et al. Inflammation and interleukin-1 signaling network contribute to depressive symptoms but not cognitive decline in old age. Exp Gerontol. 2007 Jul; 42-7: 693-701.
10. Williams BC, Remington TL, Foulk MA, et al. Teaching interdisciplinary geriatrics ambulatory care: a case study. Gerontol Geriatr Educ. 2006; 26-3: 29-45.
11. Biein B. An older person as a subject of comprehensive geriatric approach. Rocz Akad Med Bialymst. 2005; 50-Suppl. 1: 189-192.
12. Cesari M, Onder G, Russo A, et al. Comorbidity and physical function: results from the aging and longevity study in the Sirente geographic area. Gerontology. 2006; 52-1: 24-32.
13. Duursma SA, Overstall PW. Geriatric medicine in the European Union: future scenarios. Z Gerontol Geriatr. 2003 Jun; 36-3: 204-215.
14. Fry CL. Globalization and the experiences of aging. Gerontol Geriatr Educ. 2005; 26-1: 9-22.
15. Lovell M. Caring for the elderly: changing perceptions and attitudes. J Vasc Nurs. 2006 Mar; 24-1: 22-26.
16. Luttje D. Geriatric medicine in the academic world. Z Gerontol Geriatr. 2005; 38-Suppl. 1: 152-155.
17. Maki BE, Mcllroy WE. Control of rapid limb movements for balance recovery: age-related changes and implications for fall prevention. Age Ageing. 2006 Sep; 35 Suppl. 2: 12-18.
18. Johnson AK, Grippo AJ. Sadness and broken hearts: neurohumoral mechanisms and co-morbidity of ischemic heart disease and psychological depression. J Physiol Pharmacol. 2006 Nov; 57-Suppl. 11: 5-29.
19. Rejeski WJ, Brawley LR. Functional health: innovations in research on physical activity with older adults. Med Sci Sports Exerc. 2006 Jan; 38-1: 93-99.

KNOWLEDGE, RISK BEHAVIOUR AND VULNERABILITY TO HIV/ AIDS AMONG FEMALE TRIBAL WORKERS IN A SELECTED AREA OF BANGLADESH

Mohammad Quamaruzzaman [1]
http://orcid.org/0000-0001-5111-8189
Email: quamaruzzaman.bepza@gmail.com

Mehedi Hasan Khan [2]
http://orcid.org/0000-0002-1081-1072
Email: mehedi_dps@yahoo.com

Mohammad Nashir Uddin [3]
http://orcid.org/0000-0002-0113-8971
Email: m2nashir@yahoo.com

[1] Senior Assistant Secretary, Mongla Export Processing Zone, Bangladesh Export Processing Zones Authority Mongla, Bagherhat, Bangladesh
[2] Associate Professor, Department of Population Sciences, University of Dhaka, Dhaka-1000, Bangladesh
[3] Senior Scientific Officer, BCSIR Laboratories, Dhaka-1205, Bangladesh

ASTRACT

BACKGROUND

The sexual health issues and vulnerability to HIV/AIDS of the tribal female workers in the urban areas are almost non-existent in the literature in Bangladesh. An attempt was made in this study to assess the level of knowledge of HIV/AIDS, risk behaviour as well as vulnerability to HIV/AIDS among the female tribal workers in Bangladesh.

METHODS

A total of 280 young female tribal workers aged between 15-24 years working in different factories in Chittagong, the second largest urban centre in Bangladesh, were studied. A semi-structured questionnaire was used to collect the relevant information.

RESULTS

The results showed that around three-quarters of the respondents heard about the HIV/AIDS; however, their detail knowledge of HIV/AIDS was low. Sexually transmitted infection/diseases like genital ulcer and vaginal discharge and risk behaviours like low use of condom, multiple sex partners and drug abuse were also found among the workers. The most common source of information about HIV/AIDS was radio/television. The logistic regression analysis identified that women with higher education were significantly more likely to use condom during sex than women with primary education. Among other predictors, use of condom, Tripura tribe, radio/television, health service provider, mother/friends, factory workshop and knowledge score had significant odds. The significant odds in regard to sex with multiple sex partners were also found among female workers in Tanchangya tribe in comparison with Chakma tribe.

CONCLUSION

The overall findings suggest that the young female tribal workers are potentially vulnerable to HIV/AIDS issues. Consideration should be given on various issues like education, information dissemination, and treatment of sexually transmitted diseases as well as complete knowledge on HIV/AIDS in order to reduce the risk of HIV/AIDS vulnerability among the female tribal workers.

KEYWORDS: Knowledge, HIV, AIDS, Vulnerability, Female Tribal Workers and Risk Behaviour.

INTRODUCTION

The issues of HIV/AIDS formally and globally emerged as a broader development agenda during the declaration of the United Nations Millennium Development Goals (MDGs) in 2000 where MDG 6 called for unprecedented actions to fight and halt the AIDS epidemic [1]. Bangladesh, the 8th largest and one of the most densely populated countries in the world with all its underdevelopment context is also facing the potential dangers of HIV/AIDS issues [2]. The first case of HIV in Bangladesh was detected in 1989 [3]. Bangladesh has a very low HIV prevalence of <0.1% in the general population and <1% in most key affected populations. While current global trends show stabilizing or decreasing epidemics in many high-prevalence countries, Bangladesh has had a >25% increase over the past decade [4]. In 2013, it was estimated that 9,500 people were living with HIV in Bangladesh [5].

The prevalence among injecting drug users (IDUs) rose from 1.7% in 1999 to 7% in 2006 which marked the appearance of the first concentrated epidemic among any high risk group in Bangladesh [6, 7]. Though overall HIV prevalence is low, significant underreporting of cases occurs because of the country's limited voluntary testing and counseling capacity and the social stigma, which leads to the fear of being identified and detected as HIV positive [8]. Further, the behavior patterns and extensive risk factors that facilitate the rapid spread of the infection are making Bangladesh highly vulnerable to an HIV/AIDS epidemic. These risk factors include low level awareness, a large commercial sex industry, transport workers, the low level consistent condom use, significant prevalence of sexually transmitted diseases (STDs), gender discrimination and violence, stigma and discrimination related to HIV/AIDS, IDUs as well as the routine needle sharing among IDUs and frequent interaction of risk groups with the general population [9, 10, 11]. Bangladesh is surrounded by high HIV prevalence country like India and Myanmar which also poses a potential threat to become a highly vulnerable country to HIV/AIDS [12, 13]. Increased mobility of people among countries like Bangladesh, Nepal and India has the potential to create a bridge between high prevalence India and low prevalence Bangladesh and Nepal [14]. Huge number of Bangladeshi migratory labourers, both male and female, is highly vulnerable to different

health problems including HIV and STIs due to their marginal position in the destination country. Available data shows that more than 50% of the passively identified cases of HIV infections are comprised of external migrant workers and their families [15, 16].

The knowledge on symptoms, transmission and prevention of STIs and HIV/ AIDS is inadequate in this country [17]. Considering the low level awareness especially among vulnerable people as well as general population regarding HIV/AIDS, the government of Bangladesh has set a strategy in the National Strategic Plan for HIV/AIDS 2004-2010 which included one implementing strategy entitled "to create nationwide awareness through traditional and modern means of interpersonal communication and mass media" among many other implementing strategies [18]. As a signatory country to the Millennium Development Goals, Bangladesh is committed to 'to reduce HIV/ AIDS, Malaria and Tuberculosis' [19]. However, studies related to HIV/AIDS among tribal people is almost absent in Bangladesh. Furthermore the tribal people are migrating to other parts of this country in order to earn their livelihood which made them more vulnerable to HIV/AIDS.

In Bangladesh, there are approximately 45 tribal communities among which Chakma, Marma, Murang, Khumi, Hajong, Monipuri, Khashia, Garo, Mog and Rakhain are the leading tribal communities [20]. The majority of the tribal people live in the hilly districts of Rangamati, Khagrachari and Bandarban. The tribal people are usually food gatherers, hunters, forestland cultivators, and minor forest product collectors. Most of them live in hard to reach areas and in natural condition and hence, called 'son of soil'. Tribes constitute separate socio-cultural groups having distinct customs, language, traditions, marriage, kinship, property inheritance system and they are living largely in agricultural and pre-agricultural level of technology while depending on nature and impoverished economy that affects population growth and control, literacy, sex ratio, pregnancy procedure, sexual and health care [21, 22].

But, tribal population in Bangladesh is now undergoing a change due to the advent of modernization and it is being evident in their changing life style, value system and patterns of occupational trends [23]. The percentage of tribal households having income from business, transport/communication, construction and remittances has increased over the decades. At present, thousands of tribal female workers in their reproductive age are migrating to the urban areas to be employed in formal economic activities. Although there are some government and non-governments organizations' interventions to promote their reproductive health status of the women workers as a whole, very little is known about the migrated female tribal workers.

In this backdrop, the objectives of this study were to

- identify the knowledge of HIV/AIDS among young female tribal workers, and
- assess the risk behaviour and vulnerability of the female tribal workers to HIV/AIDS.

METHODS

Study Area and Population

This study was a cross-sectional and descriptive in nature. Study area was divided into two parts as per factories at the southern and the northern part of Chittagong city. The respondents were the young female tribal workers aged between 15-24 years who are migrants from other districts of Chittagong Hill Tracts and currently working at different factories in Chittagong. Information was collected from a total number of 280 respondents.

Questionnaire

Questionnaires were the key instrument for collecting data in this study. Before final data collection, a pre-test of the questionnaire was conducted to localize the languages as well as to understand the scenario from a more concrete perspective. Questionnaire included both open ended and close ended questions. Information on socio-economic condition, risk behaviour, knowledge and vulnerability to HIV/AIDS and sexually transmitted disease (STDs) issues were collected.

HIV/AIDS Knowledge Scale

In order to assess the knowledge of HIV/AIDS among the tribal workers, 14 items were developed to calculate Cronbach's Coefficient Alpha. Workers were asked to endorse either "yes", "no" or "I do not know" responses on statements about HIV/AIDS transmission, prevention and misperception. Each correct (yes response) was given 1 while incorrect (both No and I do not know) was given 0. The individual score was summed up in to scale score by arithmetic transformation procedure and used in the analysis.

Data Processing and Analysis

Data was scrutinized through necessary editing and screening. Recoding of the open ended questions was undertaken after editing of the interviewed questionnaire. Furthermore, data were doubly entered through Statistical Package for Social Sciences. At the analysis stage, mainly frequency was distributed

in regard to background profile, knowledge of HIV/AIDS, sources of knowledge of HIV/AIDS, STDs and risky behaviours. Finally, in order to identify the likelihood of risk behaviors among tribal workers, logistic regression procedure was applied as the dependent variables were dichotomous while independents were nominal, ordinal and interval level of measurement. In this regard, the following general logistic equation was used [24]:

$$\text{Log} = \frac{P_1}{1-P_1} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots \beta_p X_p$$

Where, α = intercept, β = vector of unknown coefficients, X = vector of covariates that affect the institutional delivery and delivery assisted by heath professional and p = the number of independent variables in the equation.

RESULTS

Tribal Female Workers' Socio-economic Condition

The majority of the respondents were 20-24 years of age while 32.9% of the respondents were less than 20 years of age (Table 1). Most of the respondents (56.4%) were unmarried. 36.8% of the respondents have below Secondary School Certificate (SSC)

Table 1. Socio-economic condition of the tribal female workers

Variables	Categories	Number	Percentage
Mean Age in years		21.55	
Marital Status	Unmarried	158	56.4
	Married	122	43.6
Education	Primary	53	18.9
	Below SSC	103	36.8
	SSC	101	36.1
	HSC and Above	23	8.2
Tribe	Chakma	180	64.3
	Murma	38	13.6
	Tripura	38	13.6
	Tanchangya	24	8.5
Religion	Buddhist	237	84.6
	Hindu	35	12.5
	Christian	8	2.9
Monthly Income	<=Tk3000	53	18.9
	Tk3001-5000	139	49.6
	>Tk5000	88	31.4
Residence	Rented house	252	90.0
	Mess	28	10.0

education and 36.1% of the respondents have completed the SSC. Although lower percentage, Higher Secondary Certificate (HSC) and above education was also found to some extent. Most of the respondents (64.3%) were from Chakma tribe. A few percentages of workers were also found from Murma, Tripura and Tanchangya tribe. Buddhist was the dominant religion among the tribal workers. More than four-fifths of them were Buddhist while Hindu and Christian respectively reported by 12.5% and 2.5%. The monthly income was mostly less than 5000tk(U$64) among the respondents; however, more than 5000tk(U$64) was also mentioned by slightly more than 30% of the respondents. The tribal worker came to Chittagong for job purpose mostly resided in rented house. To some extent, mess and factory premises were also mentioned.

Knowledge of HIV/AIDS

The knowledge of HIV/AIDS among the tribal workers is almost universal (Table 2). Around 78.57% of the respondents mentioned that unsafe sex can transmit HIV. To a lesser extent, transmission by infected blood transfusion, use of same syringe, mother to child, infected body transplant and breast milk were reported by the respondents.

Table 2. The percentage distribution of knowledge of HIV/AIDS

Knowledge of HIV/AIDS	Number (Yes)	Percentage
Heard about HIV/AIDS	272	97.1
Unsafe sex can transmit HIV	220	78.57
Infected blood transfusion	175	62.5
Use of same syringe	160	57.14
Mother to child transmission	184	65.71
Infected body transplant	192	68.57
Breast milk	176	62.86
Avoiding unsafe sex	220	78.57
Using condom during sex	211	75.36
Having no sex with sex workers	225	80.36
Having sex only with married partner	199	71.07
Mosquito bite can transmit HIV	175	62.50
Cough of HIV infected people can transmit HIV	180	64.29
Sharing same glass can transmit HIV	177	63.21
Cronbach's Alpha=.8132		

Comparatively, knowledge on HIV/AIDS prevention was higher among factory workers than that of transmission. For example, having no sex with sex workers was reported as preventive measure of HIV/AIDS by 80.36% of the respondents. However, the misperception was higher among the respondents. Transmission of HIV/AIDS by mosquito bite, cough and sharing same glass was respectively mentioned by 62.5%, 64.29% and 63.21% of the respondents respectively. The calculated Cronbach's Alpha in this study is .8132 which is higher than 0.7, the acceptable reliable coefficient [25]. It suggests that the inter correlations are strong enough to justify the single combined score on HIV/AIDS knowledge among the female tribal workers.

Sources of Knowledge of HIV/AIDS

The sources of knowledge of HIV/AIDS were both

mass media and personal (Table 3). The single most frequent source of knowledge of HIV/AIDS was mentioned by tribal workers as mass media (radio/ television). Health service provider as a source of such knowledge was mentioned by the majority of the workers; however, teacher and mother/friends as the sources was less reported. To some extent, factory workshop played a role in disseminating the messages of HIV/AIDS.

Table 3. The distribution of sources of knowledge of HIV/AIDS

Sources of Knowledge	Number	Percentage
Radio/TV	245	87.50
Health service provider	144	51.43
Teacher	62	22.14
Parents/friends	72	25.71
Factory workshop	35	12.50
Others	32	11.43

Symptoms of Sexually Transmitted Infections/ Diseases

The number of workers with symptoms of sexually transmitted infections/diseases is quite high (Table 4). The most common symptom was lower abdominal pain mentioned by 26.1%, while vaginal discharge was also reported by 16.4% of the respondents. Genital ulcer was also found among 4.3% of the respondents.

Table 4. The distribution of sexually transmitted infections/diseases

Sexually Transmitted Infections/ Diseases	Number	Percentage
Genital ulcer	12	4.3
Lower abdominal pain	73	26.1
Vaginal discharge	46	16.4
Others	4	1.4

Risk Behaviour of the Tribal Workers

Some risky behaviors were observed among the tribal workers in the study areas (Table 5). Among the workers, the use of condom was lower i.e., only one third of workers reported that they use condom during sexual intercourse. Sex with multiple sex partners and drug abuse were also reported by respectively 23.21% and 12.86% of the respondents among other risky behaviours.

Table 5. Attitude towards HIV/AIDS vulnerability among tribal female

Risk Behaviours	Number	Percentage
Use of condom	95	33.93
Sex with multiple sex partners	56	23.21
Drug Abuse	36	12.86

Logistic Regression Analysis

An attempt has been made in this section to predict the likelihood of risk behaviours among the tribal workers in regard to the outcome variables such as use of condom during sex, sex with multiple sex partners and drug use. Table 6 presents the odds ratio as well as significance level (p-value) by different independent variables.

Table 6. The odds ratio of risk behavior among female tribal workers

Variables	Use of Condom		Sex with Multiple Partners		Drug Abuse	
	Odds Ratio	p-value	Odds Ratio	p-value	Odds Ratio	p-value
Age at present	1.005	.842	1.015	.630	.908	.127
Marital Status (0=Unmarried and 1=Married)	.830	.055	.887	.060	.894	.128
Respondents' Education						
Primary (0)	1.000	.739	1.000	.110	1.000	.349
Below SSC and SSC	1.112	.015	.945	.056	1. 015	.312
HSC and Above	1.230	.041	.939	.052	1.120	.074
Tribes of respondents						
Chakma (0)	1.000	.019	1.000	.210	1.000	.749
Murma	.449	.075	.805	.686	.979	.412
Tripura	1.132	.046	.915	.052	.9261	.427
Tanchangya	1.082	.057	1.332	.011	1.366	.531
Religion of Respondents						
Buddhist (0)	1.000	.526	1.000	.001	1.000	.005
Hindu	.728	.317	1.034	.056	.912	.437
Christian	1.000	.548	1.040	.123	1.340	.012
Information sources						
Radio/TV (0=No and Yes=1)	.920	.015	1.267	.040	.924	.068
Health service provider (0=No and Yes=1)	.704	.038	.772	.023	.747	.015
Teacher/school (0=No and Yes=1)	1.093	.719	.635	.210	1.112	.749
Mother/friends (0=No and Yes=1)	.949	.005	.955	.076	.979	.412
Factory workshop (0=No and Yes=1)	1.323	.026	.835	.012	.861	.031
Knowledge score	1.482	.010	.832	.036	.766	.034

The results show that women with higher education were significantly more likely to use condom during sex than women with primary education. Among other predictors of use of condom, Tripura tribe, information from radio/television, health service provider, mother/ friends, factory workshop and knowledge score had significant odds. The significant odds in regard to sex with multiple sex partners were Tanchangya tribe in comparison with Chakma tribe.

DISCUSSION

The majority of tribal female workers got the information from mass media (radio/television) as well as from health service providers. However, the communication with parents as well as teacher was very low in this study, though in a study it was found that the simulation of interest in parents and teachers regarding HIV/AIDS help them to educate themselves as well as students [26]. Over all, the tribal workers demonstrated satisfactory knowledge on HIV/AIDS; however, misconception was also found in this study to a greater amount. Such higher misconceptions were in this regard to transmission of HIV/AIDS through mosquito bite, coughing and sharing needles. This suggests that the knowledge on HIV/AIDS was not complete among the tribal female workers. As a result, misconception was observed by a significant amount. In another study conducted from February- March in 1997 among overseas job seekers, it was found that most who knew about AIDS had some inaccurate knowledge about HIV transmission, such as the virus can be transmitted through touch [27].

Sexually transmitted infections or diseases were also

found which cannot be ignored. Such infections/ diseases were vaginal discharge, lower abdominal pain and genital ulcer which suggest the higher probability of getting infected with HIV/AIDS if contacted. Most importantly, the use of condom during sex was lower among the tribal workers. Besides sex with multiple partners as well as drug use was also found in this study. This suggests that with the documented prevalence of sexual behavior of multiple partners, lack of condom use, the presence of sexually transmitted infections/ diseases, the prevention of risky sexual behaviour remains an essential intervention strategy.

Tribal female workers who had HSC and above education were more likely to use condom during sexual activities compared to that of primary educated female. This may be that women with higher education are more likely to have better understating about the disease causation as well as prevention compared to factory worker with lower or primary education. As expected, women with higher knowledge score were more likely to use condom while less likely to have multiple sex partners as well as to be drug abusers. It is general fact that knowledgeable people will be health conscious and hence healthy behaviour is expected from them.

Information sources such as radio/television, health service provider, parents/friends and factory workshops had also significantly varied with regard to the likelihoods of risk behaviour. However, among all the sources, women who were informed from factory workshops were more likely to use condom during sex while other sources had lower likelihood to some of the risky behaviour. This may be because information getting from factory workshop was recent and also made workers health conscious with proper environmental support i.e., medical facilities at the factories.

Among the different tribes, female workers from Tripura tribe were significantly more likely to use condom during sex while workers from Tanchangya significantly more likely to have multiple sex partners compared to that of Chakma. With regard to religion, factory worker from Christian religion were more likely to abuse drug compared to female factory workers from Buddhist community.

CONCLUSION

The overall findings showed that female tribal workers are at risk to HIV/AIDS vulnerability due to the low level of knowledge on HIV/AIDS, presence of sexually transmitted disease symptoms and risk behaviors such as low condom use, multiple sex partners and drug abuse. However, the risk behaviors varied depending on the different characteristics of the tribal workers. Therefore, consideration should be given on various issues like education, information dissemination, treatment of sexually transmitted diseases as well as complete knowledge of HIV/AIDS in order to reduce the risk of HIV/AIDS vulnerability.

REFERENCES

1. UNAIDS. Global Report: UNAIDS Report on the global AIDS epidemic 2013. 2013; p.2. Available from: http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_2013_en_1.pdf [accessed on June 20, 2015].
2. Population Reference Bureau (PRB). 2014 World Population Data Sheet. 2014; p.2. Available from: http://www.prb.org/pdf14/2014-world-population-data-sheet_eng.pdf [accessed on June 20, 2015].
3. Government of Bangladesh. National Strategic Plan for HIV/AIDS 2004-2010. 2005; p.1.
4. UNAIDS. The UN Joint Programme of Support on HIV/AIDS Operational Plan and Budget Bangladesh 2013. UNAIDS Country Office, Bangladesh.2013; p.5.
5. UNAIDS. HIV and AIDS Estimate (2013). Available from: http://www.unaids.org/en/regionscountries/countries/bangladesh [accessed on June 20, 2015].
6. Azim T, Rahman M, Alam MS, Chowdhury IA, Khan R, Reza M, Rahman M, Chowdhury EI, Hanifuddin M, Rahman AS. Bangladesh Moves from Being a Low Prevalence Nation for HIV to One with a Concentrated Epidemic in Injecting Drug Users. International Journal of STD & AIDS, Royal Society of Medicine Press. 2008; 19-5: 327-331.
7. HIV Surveillance in Bangladesh 2007. Available from: file:///C:/Users/User/Downloads/HIV%20surveillance%20in%20Bangladesh.pdf [accessed on June 20, 2015]
8. Md. Tanvir Hasan, Samir Ranjan Nath, Nabilah S. Khan, Owasim Akram, Tony Michael Gomes, and Sabina F. Rashid. Internalized HIV/AIDS-related Stigma in a Sample of HIV-positive People in Bangladesh. J Health Popul Nutr. 2012 Mar; 30-1: 22–30.
9. Tasnim Azim, Sharful Islam Khan, Fariha Haseen, Nafisa Lira Huq, Lars Henning, Md. Moshtaq Pervez, Mahbub Elahi Chowdhury, and Isabelle Sarafian. HIV and AIDS in Bangladesh. J Health Popul Nutr. 2008 Sep; 26-3: 311-324.
10. Nidhi Khosla. HIV/AIDS Interventions in Bangladesh: What Can Application of a Social Exclusion Framework Tell Us? J Health Popul Nutr. 2009 Aug; 27-4: 587-597.
11. Haider M, Ahmed SN, Jaha NK. Bangladesh HIV/AIDS communication challenges and strategies. Bangladesh Med Res Counc Bull. 2008; 34-2: 54-61.
12. Uddin MJ, Sarma H, Wahed T, Ali MV, Koehlmoos TP, Nahar Q, Azim T. Vulnerability of Bangladeshi street-children to HIV/AIDS: a qualitative study. BMC Public Health. 2014, 14: 1151.
13. Sadhya G, Islam AKMS, Islam R, Ahmed NU, Rahman M. Knowledge And Awareness About The Risk Of HIV/AIDS Among Truck Drivers of A Selected Area. Faridpur Med Coll J. 2010; 5-2:46-49.
14. Care-Nepal. Vulnerability to HIV & AIDS: A social Research on Cross Border Mobile Population from Bangladesh to India. 2011. Available from: http://www.carebangladesh.org/publication/Publication_694108.pdf [accessed on June 20, 2015].

15. IOM and UNAIDS. Situation Analysis: Migration and HIV in Bangladesh. Available from: http://hpnconsortium.org/dppanel/materials/Situation_Analysis_-_Migration_and_HIV_in_Bangladesh.pdf [accessed on June 20, 2015].
16. Johnson PL. Male Migrants As a High-Risk Group: Harm Reduction and HIV/AIDS In Bangladesh. Asian Affairs. 2003; 25-3:5-29.
17. Sharmin S, Sharmin T, Rahman A. Knowledge on HIV/AIDS among different population groups in Bangladesh: A review. Bangladesh Private Medical Practitioners Journal 2005; 11-2: 89-92.
18. Government of Bangladesh. National Strategic Plan for HIV/AIDS 2004-2010. 2005; p.1
19. Government of Bangladesh. Millennum Development Goals: Bangladesh Progress Report 2013. 2014: p19.
20. Government of Bangladesh. Tribal/Ethnic Health Population and Nutrition Plan for the Health, Population and Nutrition Sector Development Program (HPNSDP) 2011 to 2016. 2011; p.1. Available from: http://hpnconsortium.org/admin/essential/Tribal_health_Planfor_HPNSDP_20111-2016.pdf [accessed on June 20, 2015].
21. Tone Bleie. Tribal Peoples, Nationalism and Human Rights Challenge: The Adivasis of Bangladesh. The University Press Limited. 2005.
22. Ramkanta Singha. Ethnic Peoples of Bangladesh. A H Development Publishing House. 2002
23. Rahman SA, Kielmann T, McPake B, Normand C. Healthcare-seeking Behaviour among the Tribal People of Bangladesh: Can the Current Health System Really Meet Their Needs? J Health Popul Nutr. 2012 Sep; 30-3: 353-365.
24. Afifi AA, Clark V. Computer Aided Multivariate Analysis. Variable selection in regression analysis. Third edition. Chapman and Hall, 1996; 166-196.
25. Nunnaly JC. Psychometric Theory. New York: McGraw-Hill. 1978. Available from: http://unjobs.org/tags/psychometric-theory [accessed on June 20, 2015].
26. Maswanya, ES, Moji K, Horiguchi I, Nagata K, Aoyagi K, Honda S, Takemoto T. Knowledge, risk perception of AIDS and reported sexual behaviour among students in secondary schools and colleges in Tanzania. Health Educ Res. 1999; 14-2: 185-196.
27. Rahman M, Shimu TA, Fukui T, Shimbo T, Yamamoto W. Knowledge, attitudes, belief and practices about HIV/AIDS among the overseas job seekers in Bangladesh. Public Health. 1999; 113-1: 35-38.

MENINGOCOCCAL DISEASE IN CHILDREN AT THE PRESENT STAGE: PROBLEMS AND SOLUTIONS

Yeraliyeva LT[1]
http://orcid.org/0000-0002-0892-166X
Email: elt.niifpm@kaznmu.kz

Tukhanova NB [2]
http://orcid.org/0000-0002-6514-3745
Email: tukhanovanur@gmail.com

[1] Director of Atchabarov Research Institute of Fundamental and Applied Medicine, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan, MD, PhD
[2] Researcher of Atchabarov Research Institute of Fundamental and Applied Medicine, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan, MD

ASTRACT

The article reviews the major up-to-date problems meningococcal infection and presents a laboratory analysis of generalized forms of meningococcal infection (MI) in children aged 0 month to 14 years. The age-related features of the disease under the present conditions and a relationship of the frequency serogroup of a meningococcal infections in Almaty.

KEYWORDS

Meningococcal infection, Meningococcus serogroup B, Vaccination, Immunization, Children.

INTRODUCTION

Meningococcal infection is one of the most common invasive bacterial infections in the world which remains highly significant today High mortality rate reaching up to 10.5% is registered in generalized forms of the disease [1, 2, 3]. In most cases, the disease develops rapidly, thereby requiring urgent need of early diagnosis and emergent therapeutic aid from its onset. Meningococcal disease has various nosological forms that on their turn stipulate the necessity of differential diagnostics. According to WHO, 500 thousand cases of generalized forms of meningococcal infection are registered every year; 50 thousand of them are fatal [3, 14]. The hearing loss, loss of limbs and reduced intelligence are released among the possible after-effects [4, 13].

The epidemiology of meningococcal disease

Meningococcal disease is registered in many countries of the world on different climatic zones. The infection incidence increase is correlated with the wars, disasters and major accidents, which allowed giving it a definition of «war» infection. Agents have a special role in the occurrence of generalized forms of meningococcal infection. If their quantity in closed team reaches up to 20% or more, there occur clinically symptomatic forms of the disease [7, 8, 14].

Currently there are 13 serogroups of meningococci that differ in their immunologic reactivity of the polysaccharide capsule known. Unencapsulated serotypes are less virulent than encapsulated ones. The generalized form of the disease causes limited quantity of meningococcus serotypes. They are mainly A, B, C, W-135, Y serotypes [1, 3].

Serogroup A causes large-scale epidemics, mostly common in sub-Saharan Africa, which is known as meningococcal zone [5, 6, 11, 15].

Serogroup B causes sporadic or endemic cases, is reported in Europe, Cuba, Chile and New Zealand. This serogroup is characterized by disease severity and high mortality rate.

Serogroup C also causes large-scale epidemics which frequently occurs in Africa, Brazil, USA, Canada and Western Europe. This disease is often recorded in adolescents and young adults [5, 6, 7].

Serogroup W-135 became best known in the years 2000-2002 after it was found in majority of people doing the Hajj on places of pilgrimage.

Serogroup Y is common in the United States, Israel, serogroup X in Nigeria and Africa [3, 5, 12] .
In Central Asia the exact distribution of individual serogroup are unknown.

In Kazakhstan, meningococcal infection is common in children. According to official statistics of the Republic of Kazakhstan, the highest incidence was registered in Almaty (1.58 per 100 thousand people in 2012) and Astana (1.38 per 100 thousand people in 2012). At the present time, despite the decrease in morbidity, the mortality rate remains high.

In the years 2009-2013 the study between the children of Almaty was conducted to investigate the clinical and epidemiological features of meningococcal disease at the current stage. Its main goal was evaluating the incidence of generalized forms of meningococcal disease in children aged 0-14 years, assessing the distribution of serogroups of Neisseria meningitides among sick children, estimating the proportion meningococcal meningitis and meningitis of unknown

etiology in the overall structure of bacterial meningitis and assessing the treatment frequency, the incidence of complications and mortality at intensive care units,.

The study revealed that in five years the incidence of meningococcal disease ranged from 5.7 per 100 thousand people to 14.7 cases per 100 thousand people. These figures twice exceed the given official information. The lowest incidence was observed in 2009 and the highest in 2012. All these figures demonstrate the ripple effect nature of meningococcal disease epidemic, which on its turn allows predicting an increase of incidence the next two years. The laboratory confirmation of generalized meningococcal infection cases in children younger than 14 years was taken in 70% of cases on average. The study revealed the predominance of serogroup B in 67% of cases, less extent on serogroups A and C and meningococcus of other serogroups were not detected.

The children under the age of 5 years predominated in cases, with the highest incidence observed in children aged younger than 1 year.

In general, all purulent bacterial meningitis incidences over the period 2009-2013 have no downward trend. In its etiological structure the child population in the city of Almaty (between 1993-2007) had dominating meningococcal meningitis (32%) and unfortunately, the percentage of meningitis of unknown etiology remained high (39.8%) as well.

Characters of meningococcal disease in young children (according to Child infections research institute Russia, St. Petersburg)

-The dominance of meningococcemia (50%);
-Severity of overall infective and brain symptoms;
-In 70% of cases the disease starts with catarrhal symptoms with the cerebral and meningeal symptoms revealing during the next 2-3 days;
- Cerebral syndrome in 53% of cases is manifested by generalized tonic-clonic seizures;
- On the background of a generalized infection in 65% of cases the dysfunction of the gastrointestinal tract is revealed.

Characters of meningococcal disease in adolescents (according to Child infections research institute Russia, St. Petersburg)

- Prevalence of Mixed forms (50%);
- Moderate overall infective and expressed cerebral and meningeal syndrome;
- High frequency (up to 18%) of extracranial complications (arthritis, myocarditis, heart attack, eye disease);
- Relapsing course in 11% of cases;
- In 26% of cases rash on the 3-5th day of illness.

The structure of the after-effects of generalized forms of meningococcal infection (GFMI)

Among 128 children under observation, 60.5% were treated in the ICU while the mean residence time was 9 days.

According to the results of our own research, dominating after-effects of generalized forms of meningococcal infection were infectious toxic shock of I-II degree, disseminated intravascular coagulation syndrome I, II, acute heart failure; the convulsive syndrome, myocardial and intestinal bleeding could be observed as well.

The outcomes of meningococcal disease

11% of cases ended lethally, the impact of serotype on outcome could not be reliably determined, in one case it was meningococcus of serogroup A, in four other cases serogroup B.

89% of patients were discharged from the hospital, further supervision of a neurologist recommended, because of after-effects of different degrees in the psychoneurological status.

Ways of meningococcal disease prevention:

One of the main methods for the prevention of meningococcal disease is vaccination. Vaccines are of two types - conjugate and polysaccharide.

The polysaccharide meningococcal vaccine:

- Contain freeze-dried encapsulated polysaccharide of appropriate meningococcal serogroups;
- Indicated for immunization of children older than 2 years, adolescents and adults;
- Epidemiological efficiency reaches up to 85-95%;
- Re-vaccination is recommended not earlier than 3 years. For the children vaccinated before the age of 5, if at high risk, revaccination is recommended after 2-3 years.

For the children under the age of 2 years, that are infected more than in half of all cases of meningitis, these vaccines like all polysaccharide vaccines cause a weak immune response.

The conjugated meningococcal vaccine:

-Contain relevant meningococcal serogroup polysaccharides conjugated to a carrier protein that allows the start of T-cell responses at any age;
-Induce a strong immune response in all age groups;
-Indicated for immunization to 9 months. (FDA) up to 55 years;
- Vaccination regimen for children 9-23 months: 2 doses at an interval of 3 months (FDA);
- Vaccination regimen for the people aged from 2 to

55 years: a single regimen;
- Booster vaccination: once at the age of 15-55 years (according to epidemiological indications) [8, 9, 10, 12].

CONCLUSION

The epidemic meningococcal process in Kazakhstan has ripple effect character today. The figures of child morbidity by meningococcal disease in Almaty exceed the country by more than 4 times, and overall morbidity rate in Kazakhstan for 13 times, indicating a high risk of infection of the child population of the city.

In the structure of generalized forms of meningococcal infection serogroup B remained dominant for years 2009-2013, showing 66.7%.

In 40% of cases had after-effects during generalized forms of meningococcal infection. The most frequent after-effects were toxic shock, disseminated intravascular coagulation and acute cardiovascular failure.
Children under the age of 5 years are at highest risk, which is the basis for the development of specific measures for specific immunization of meningococcal disease in this age group.

REFERENCES

1. Dinleyici EC., Kurugol Z. 6th World Congress of the World Society for Pediatric Infectious Diseases (WSPID). Expert Rev Vaccines. 2010; 9(3): 261-272.
2. Vestergard D., David KP. Global spread of meningococcal serogroup W135. Ugeskr. Laeder. 2008; 170-39: 3044—3047.
3. WHO. Meningococcal meningitis. Weekly Epidemiological Record. 2003; 78-33: 285-296. Available from http://www.who.int/wer/en/ [accessed on June 15, 2015].
4. Harrison LH., Trotter CL., Ramsay ME. Global epidemiology of meningococcal disease. Vaccine. 2009; 27: 51-63.
5. Tan LK., Carlone GM., Borrow R. Advances in the development of vaccines against Neisseria meningitidis. N. Engl. J. Med. 2010; 362-16: 1511-1520.
6. Parkhill J., Achtman M., James KD. et al. Complete DNA sequence of a serogroup A strain of Neisseria meningitidis Z2491. Nature. 2000; 404-6777: 502—506.
7. Shyshov AS. Purulent meningitis as a syndrome, a clinical marker of generalized bacterial infections and an indicator of their severity. Journal of Neurology and Psychiatry. 2009; 5: 92-96.
8. Trotter CL., Ramsay M E. Vaccination against meningococcal disease in Europe: review and recommendations for the use of conjugate vaccines. FEMS Microbiol. Rev. 2007; 31-1: 101-107.
9. Vidarsson G., Overbeeke N., Stemerding AM. et al. Working mechanism of immunoglobulin A1 (IgA1) protease: cleavage of IgA1 antibody to Neisseria meningitidis PorA requires de novo synthesis of IgA1 Protease. Infect. Immun. 2005; 73-10: 6721-6726.
10. Rosenstein NE., Parkins BA., Stephens DS., Popovic T., Hughes JM. Meningococcal disease. N Engl J Med. 2001; 344-18: 1378—1388.
11. Prevention and control of meningococcal disease. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2000; 49-RR-7: 1-10.
12. Shyshov AS. About the system of registration and account of «Acute neuroinfections». Epidemiology and Infectious Diseases. 2006; 2: 56-61.
13. Lobzin YV., Pilipenko VV., Gromyko YN. Meningitis and encephalitis. Monograph. Foliant, St. Petersburg. 2006: 2-54.
14. Rtishchev AYu., Shamsheva OV. The Problem of Prophylaxis of Meningococcal Disease at Children: Ways of The Decision. Childhood infections. 2009; 3: 31-35.

HEALTHY AGEING – A SOCIAL RESPONSIBILITY

Sharma Ritu [1]
http://orcid.org/0000-0001-9157-404X
E-mail: ritusharen@rediffmail.com

Aparajit B. Dey [2]
E-mail: abdey@hotmail.com

[1] PhD, Assistant Professor, Department of Psychology, Aditi Mahavidyalaya, University of Delhi, Delhi-39 INDIA
Member organizing committee, Indian Association of Positive Psychology (www.iapp.org.in)
Member - International Association of Applied Psychology, Indian Association of Gerontology, India Career Development Association (www.icda.in)
[2] Professor of Medicine, Department of Medicine, All India Institute of Medical Sciences, New Delhi 110029 INDIA

ASTRACT

Getting old is a blissful act which people should celebrate because there are many who will not be able to enjoy their life till 60 years of age. But unfortunately people are scared of getting old in our society. It is because of lot of negative biological and social outcomes attached with the old age. Medical advancement and technological up gradation has shifted the scenario for negative biological implications of aging process, now people can look younger in their 80's too. But the main fear for aging lies in stereotypes, discrimination and taboos which are deep rooted in our society and effect the outlook of an aged as well as young person towards Old age. Healthy aging is again a subjective connotation which depends on the perception of an individual towards his physical, psychological, social and spiritual well-being which can be attained in isolation. Therefore healthy aging is a social responsibility and every society should be prepared to support his older citizens with positive and supportive environment.

KEYWORDS: Healthy Ageing, Successful Ageing, Life Style, Physical Activity, Social Support

In the last century the longevity of the human life has increased tremendously. The resultant change in the population profile has left many people living to a very long age. The natural corollary of living long is getting old. Getting old is associated with the declining adaptability of the organism to various stresses and increases the chances of mortality [1]. Therefore ageing is described as a progressive deterioration of the physical and mental functions after the growth period is over.

All of us do not age the same way. A man of 60 may look like 70, and another the same age may look like 50. This is not only because of the differences in the genetic make up but it also depends on their nutrition, psychological stress, lifestyle, socioeconomic status, and the surrounding environment during the developmental period [2]. Health is very important for ensuring healthy ageing and maintaining the older population in a reasonably satisfactory state of existence. Health may be regarded as a balance of physical, mental and social aspects of life in a being. According to WHO "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [3].

In general terms health can be assessed by how effectively and successfully a person functions. Feeling capable and competent; being able to handle normal levels of stress, maintain satisfying relationships, and lead an independent life; and being able to «bounce back,» or recover from difficult situations, are all signs of mental health. Therefore, all emotional, physical, and social aspects must function together to achieve overall health. The LaLonde report suggested that there are four general determinants of health including human biology, environment, lifestyle, and healthcare services [4]. Thus, health is maintained and improved not only through the advancement and application of health science, but also through the efforts and intelligent lifestyle choices of the individual and society.

What is Healthy Ageing?

Active and healthy ageing has been considered as the goal of life by the United Nations and the World Health Organization. Healthy ageing describes the ongoing activities and behaviors you undertake to reduce the risk of illness and disease and increase your physical, emotional and mental health. It also means combating illness and disease with some basic lifestyle realignment that can result in a faster and more enduring recovery. If 90 years is regarded as the approximate target terminal age for the older persons, it implies that to keep older people reasonably healthy for at least 30 years, in spite of the continuing biological decline.

Factors influencing Healthy Ageing

What factors affect the physical, mental and social health of the older persons? What made a person to look like 70 in his 60 years of age? What made a person to pray for his death day?

Biological diseases and disabilities: Ageing is not a disease; it is a slow process through which an adult individual gradually passes with predictable biological decline. The ageing process which is inevitable for all is always associated with a decline in physiological function, which ultimately leads to various types of morbidity. This functional decline varies from one individual to another in a significant manner [5]. Almost all body functions such as cardiac performances, respiratory and renal functions, sensory faculties, nerve impulses conduction, muscle strengthened ability to maintain coordinated muscular effort, all of which may structural and functional

changes [6, 7]. Chronic diseases exact a particularly heavy health and economic burden on older adults due to associated long-term illness, diminished quality of life, and greatly increased health care costs.

Societal/Environmental: Ageing is accompanied by inevitable physical, biological, emotional, intellectual and personality changes. Most of the changes occurring in old age are small in magnitude but combined together, they have several different effects. Caring for the old parents is no longer due to high emotional attachment but it is more or less due to duty, social pressure and legal bindings. The breaking down of joint family system, selfishness, lack of adjustment, refusal to compromise and with more and younger women entering the work spree, care and attention given to elderly persons is becoming difficult. In the present context there is a lack of energy, time, patience and manpower to attend to elder frail persons.

Life style: Longevity in general is related to the ways of living, eating, eating, drinking and smoking habits, socioeconomic and psychosocial factors, all grouped under the broad heading of life styles [8]. The various diseases that are related to life styles and are thus preventable thereby bear a close relationship with the longevity are- coronary artery disease, hypertension, lung cancer, obesity, gall stones, osteoarthritis and diabetes.

The tripod of life style consists of nutrition (including alcohol intake), physical activity (sedentary or active living habits) and role of mind (breathing, meditation, yoga and biofeedback). The excess intake of calories, saturated fats and refined carbohydrates and lack of complex carbohydrates in diet are responsible for higher occurrence of coronary heart disease and certain forms of cancer. For centuries physical exercise has been considered to promote health in general and prevent cardiovascular and metabolic disorders like diabetes and obesity. But older people are not aware of nutritional diet, importance of exercise and physical activity in their life [9].

Psychological Aspects: Healthy Ageing includes a satisfying quality of life: a key factor in achieving this is maintenance of the ability to engage with one's community in a meaningful way. A major fear in the elderly is loss of this key human facility, and with it, loss of independence and the ability to make important decisions. The psychological health of the older people decline with their physical health [10]. The economic dependence, burden of costly long time health care, isolation, low status in family and society, feeling of helplessness and worthless bring down the level of self efficacy, quality of life, and life satisfaction. As a result there is an increasing complaint of depression in old age [11].

Education and occupation: The elderly population will be confronted with socioeconomic deprivation and compromised health because large sections of the elderly people are uneducated and depend on others for their survival [12]. Society should come forward to meet the education, training and information needs of the older persons. Educational programs should incorporate materials to strengthen inter-generational bonds and mutually supporting relationships. Interaction with educational institutions will be facilitated whereby older persons with professional qualifications and knowledge in science arts, environment, socio-cultural heritage, sport and other areas could interact with children and young persons. Schools and society should be encouraged and assisted to develop outreach programs for interacting with the older persons on a regular basis, participating in the running of senior citizens' centers and develop activities in them.

Why to live healthy in old age?

Speed of population ageing: The number of older persons has tripled over the last 50 years; it will be more than triple again over the next 50 years. In 1950 only three countries had more than 10 million people 60 or older - China (42 million), India (20 million) and the United States of America (20 million). In 2000 the number of countries with more than 10 million people aged 60 or over increased by 12, including 5 with more than 20 million older people - China, India, United States of America, Japan and Russian Federation. Over the first half of the century, the global population 60 or over is projected to expand by more than three times to reach nearly 2 billion in 2050.

Burden of disease: The aged population is vulnerable to many acute diseases such as infection, vascular events and accidents; chronic diseases such as hypertension, cataract, heart disease, chronic bronchitis, diabetes, degenerative arthritis, depression, stroke, enlargement of prostate, cancers and functional GI disorders; disabilities such as and other health related problem such as physical dependence, stroke, osteoporosis & fracture, heart failure, and dementia [13]. However heart attack, stroke and cancer are the killers, disabling and costly to treat, these are potentially preventable and require more attention from the health care system.

Feminization of ageing: Feminization of ageing is evident from the significantly higher number of older women aged 80+ than men. In 2000, the ratio was

1,720 females to just 1,000 males, and eight out of ten of these old-old women were widowed. The women's longer life expectancy is a contributing factor to the sex ratio in their favor. Physical frailty and disability occur naturally with older ages, and the report shows that women with disabilities outnumber men significantly [14, 15]. Statistically, women among the semi-ambulant and non-ambulant elderly aged 65 and above outnumbered men by almost twice in 2000. In absolute numbers, there were a total of 17,270 older women in both categories compared to only 8,580 men in 2000, it is estimated that 51% of the elderly population would be women by the year 2016.

Ageing 'Usual' or 'Successful'

There are two aspects of ageing one is 'usual' and another is 'successful' ageing. Usual ageing is associated with diseases, disabilities, loss of function and fitness, lack of social and economic productivity. However the successful ageing can be predicted through the ability to meet basic self-care needs independently, high level of self efficacy and high feelings of achievement and satisfaction.

Role of society in health promotion of aged

It is the responsibility of the society to ensure that population remains healthy as it ages. Indian traditional and religious teaching demands that children would take care of their parents in old age. However, economic considerations, dual careers, migration and individualism have contributed to a decline in this system. As a result there is an increasing trend among older people to live independent of their children, in spite of their diseases, disabilities and economic restraints. They are helpless and need the helping hand of the society for their survival and to raise their status.

Social determinants of health are the economic and social conditions under which people live determine their health. Virtually all major diseases are primarily determined by specific exposures to these conditions. These 11 social determinants of health are: Aboriginal status, early life, education, employment and working conditions, food security, gender, health care services, housing, income and its distribution, social safety net, social exclusion, unemployment and employment security [16].

Old is considered synonymous with physical and cognitive decline, disease and disability, financial insolvency, burden to the family, conservatism and a misfit in the mainstream society. But there were days when they were treated with dignity, respect and as storehouse of wisdom whose advice was sought. Does this mean that old age is all liabilities and there are no means by which, in contemporary times, the services of the older people can be utilized for the benefit of the community?

The United Nations has declared Year 2001 as the International Year of Volunteers to address the important contribution of the older persons in the community [17]. Voluntary work is indispensable not just for the community, but also offers older people who have retired a possibility to find a new source for self-realization. The demographic changes, with all their challenges for health and social systems, the pensions system, care and family policy, the economy and education, require a clear avowal of an active and positive design of the social framework. Ageing in good health while leading a self-determined life and being fully integrated in society is a perspective we have to open up for an ever-increasing number of people.

Elder persons make innumerable contributions to their families, societies and economies. The notion that the elderly do not or cannot contribute to development is a myth. Support of the older generation is vital for the overall growth of our country, and in turn, they will need our practical assistance in providing moral support and care. Society should encourage families to develop and nurture a culture of reciprocal assistance to enable all age groups to contribute to national development efforts. All countries should address ageing in line with their national conditions, take full account of the needs of older persons and incorporate ageing into their economic and social development programs for good nutrition and nutritious food [9], physical exercise to tone up the body and improve fitness [18], awareness of the principles of mental health [19] and their practice in day to day life (meditation and yoga) [20], strategies of motivation, support for basic needs of sustenance, immunization, availability of physical and emotional support, prevent the excessive intake of smoking and alcohol [21] and provision for scope for personal growth within the limits of physical activities [22, 23]. Proactive measures to protect the rights of older persons and enhance their quality of life constitute an important responsibility of governments and societies worldwide, so that they can, as far as possible, participate in an active social life and realize their spiritual potential.

Ageing takes places within a social context. The bond between adult children and parents is usually identified as intergenerational relationship. It is associated with positive sentiments of love, respect, appreciation, and the feeling of attachment people have for one another. Society can promote orphanages managed by older widows/widowers, multigenerational housing schemes with intergenerational cooperation,

mutigenerational schools and self help groups, which are sustainable by self. This would entail promoting physical fitness, postponing or averting the early onset of degenerative changes, promoting cognitive efficiency and improving overall functional competence of the older persons [24].

The extent to which an older person is enmeshed within a social network of kin, friends and neighbors will greatly affect his experience of ageing. A social support system is a pattern of continuous and/or intermittent ties and interchanges of mutual assistance that plays a significant role in maintaining the physical, social and psychological integration of the individual over time. A good social support network can fulfill the needs of the socialization, carrying out the activities of daily living and personal assistance during time of crisis of the older people can turn usual ageing into successful ageing [22, 25, 26].

Our elders represent a bond between the present and the past of all of us. The great challenge ahead is to offer all ageing persons a society in which they can develop their human potential. Older persons can be confident that their future is in good hands, in the hands of young people, in the hands of the future older persons.

REFERENCES

1. Shah B, Prabhakar AK. Chronic morbidity profile among elderly. Indian J Med Res. 1997; 106: 265-272.
2. Dey AB, Soneja S, Nagarkar KM, Jhingan HP. Evaluation of the health and functional status of older Indians as a prelude to the development of a health programme. Natl Med J India. 2001; 14-3: 135 -138.
3. World Health Organization (WHO). Constitution of the World Health Organization. 2006.
4. Lalonde M. A New Perspective on the Health of Canadians. Ottawa: Minister of Supply and Services. 1974.
5. Fried LP, Ettinnger WH, Lind B, Newman AB, Gardin J. Physical disability in older adults: A physiological approach J Clin Epidemiol. 1994; 47-7: 747-760.
6. Alves LC, Quinet Leimann BC, López Vasconcelos ME, Sá Carvalho M, Godoi Vasconcelos AG, Oliveira da Fonseca TC, Lebrão ML, Laurenti R. [The effect of chronic diseases on functional status of the elderly living in the city of Sao Paulo, Brazil]. Cad Saude Publica. 2007; 23-8: 1924-1930.
7. Broe GA, Jorm AF, Creasey H, Grayson D, Edelbrook D, Waite LM, Bennett H, Cullen JS, Casey A. Impact of chronic systemic and neurological disorders on disability, depression and life satisfaction. Int J Geriatr Psychiatry. 1999; 14-6: 497-499.
8. Arlappa N, Balakrishna N, Brahmam GN, Vijayaraghavan K. Nutritional status of the tribal elderly in India. J Nutr Elder. 2005; 25-2: 23-39.
9. Horwath CC. Nutrition goals for older adults: a review. Gerontologist. 1991; 31-6: 811-821.
10. Hoeymans N, Feskens EJ, Kromhout D, van den Bos GA. Ageing and the relationship between functional status and self-rated health in elderly men. Soc Sci Med. 1997; 45-10: 1527-1536.
11. Beekman AT, Kriegsman DM, Deeg DJ, Vn Tilburg W. The association of physical health and depression in the older population: Age and sex differences. Soc Psychiatry Psychiatr Epidemiol. 1995; 30-1: 32-38.
12. Elliott JO, Lu B, Moore JL, McAuley JW, Long L. Exercise, diet, health behaviors, and risk factors among persons with epilepsy based on the California Health Interview Survey, 2005. Epilepsy Behav. 2008; 13-2: 307-315.
13. Hebert RC, Brayne C, Spiegelhalter D. Factors associated with functional decline and improvement in a very elderly community-dwelling population. Am J Epidemiol. 1999; 150-5: 501-510.
14. Ganguli M, Dube S, Johnston JM, Pandav R, Chandra V, Dodge HH. Depressive symptoms, cognitive impairment and functional impairment in a rural elderly population in India: a Hindi version of the geriatric depression scale (GDS-H). Int J Geriatr Psychiatry. 1999; 14-10: 807-820.
15. Mandegar MH, Marzban M, Lebaschi AH, Ghaboussi P, Alamooti AR, Ardalan A. Gender influence on hospital mortality after coronary artery bypass surgery. Asian Cardiovasc Thorac Ann. 2008; 16-3: 231-235.
16. Raphael D. Addressing the Social Determinants of Health in Canada: Bridging the Gap between Research Findings and Public Policy. Paper given at The Social Determinants of Health Across the Life-Span Conference, Toronto. 2002.; article in Policy Options 2003/2: 35-44.
17. Public Health Agency of Canada (PHAC). International Year of Volunteers, in Ageing and Seniors. 2001.
18. Luukinen H, Lehtola S, Jokelainen J, Väänänen-Sainio R, Lotvonen S, Koistinen P. Prevention of disability by exercise among the elderly: a population-based, randomized, controlled trial. Scand J Prim Health Care. 2006; 24-4: 199-205.
19. Sharma R, Chadha NK. Self rated mental health of the elderly on their life satisfaction. Indian J Gerontol. 2006; 20-4: 389-398.
20. Bastille JV, Gill-Body KM. A yoga-based exercise program for people with chronic poststroke hemiparesis. Phys Ther. 2004. 84-1: 33-48.
21. Chhabra SK, Rajpal S., Gupta R. Patterns of smoking in Delhi and comparison of chronic respiratory morbidity among beedi and cigarette smokers. Indian J Chest Dis Allied Sci. 2001; 43-1: 19-26.
22. Hill K, Smith R, Fearn M, Rydberg M, Oliphant R. Physical and psychological outcomes of a supported physical activity program for older carers. J Aging Phys Act. 2007; 15-3: 257-271.
23. Howe TE, Rochester L, Jackson A, Banks PM, Blair VA. Exercise for improving balance in older people. Cochrane Database Syst Rev. 2007; 17-4: CD004963.
24. Elosua R, Bartali B, Ordovas JM, Corsi AM, Lauretani F, Ferrucci L; InCHIANTI Investigators. Association between physical activity, physical performance, and inflammatory biomarkers in an elderly population: the InCHIANTI study. J Gerontol A Biol Sci Med Sci. 2005; 60-6: 760-767.
25. Gautam R, Saito T, Kai I, Leisure and religious activity participation and mental health: gender analysis of older adults in Nepal. BMC Public Health. 2007; 7: 299.
26. Ku PW, McKenna J, Fox KR. Dimensions of subjective well-being and effects of physical activity in Chinese older adults. J Aging Phys Act. 2007; 15-4: 382-397.

MAGNETOCARDIOGRAPHY: EARLY DIAGNOSTIC OF HEART DISEASES

Stadnyuk LA [1]
http://orcid.org/0000-0002-9469-7106
E-mail: stadnyuk@mail.ru

Sosnytska TV [2]
http://orcid.org/0000-0001-6766-124X

Miasnikov GV [2]
http://orcid.org/0000-0002-1714-1841

Sosnytskyy VN [3]
http://orcid.org/0000-0001-7227-2783
E-mail: sosna1@voliacable.com

[1] PL Shupik Medical Academy for Postgraduate Education, Kiev, Ukraine
[2] General Military-Medical Clinical Center, Kiev, Ukraine
[3] VM Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine, Ukraine

ASTRACT

Noninvasive screening technique to identify cardiac disease in its early phase is developed. Magnetic imaging of cardiac action currents is a new and an ideally suited technology for testing the level of local electric heterogeneities of myocardium. Magnetocardiography (MCG) has the potential to make a valuable contribution in basic examination and analysis of biosignals of a heart, in particular whilst all vector components are used, vast spatial coverage and excellent signal quality. Browsing the data for the sake of reliability by QT-interval can be useful for the better reproducibility of high performance MCG. MCG in therapeutic practice can be use to address the following objectives: a) determining presence and intensity of myocardial ischemia, b) assess effectiveness of antianginal therapy; c) assess the risk of paroxysm of ventricular tachycardia; d) objectivize presence of cardiac deficiency.

KEYWORDS: Magnetocardiography, Electrical Heterogeneity, ECG, Noninvasive Electrophysilogy, Arrhythmia

1. CLINICAL APPLICATION OF MCG

Clinical MCG investigations have revealed applications that appear to be most attractive, and these are the localization of preexcitation sites in the WPW Syndrome and other arrhythmias along with the detection of myocardial ischemia and viability.

Since 1985, MCG studies have been focused on demonstrating the high accuracy of localization compared with other available clinical techniques. R Fenici et al. [1] demonstrated clearly the superior ability of MCG to localize a current source compared with BSPM. All these years numerous theoretical and experimental research have been conducted on the quantitative estimates of the sensitivity and specificity MCG-method applied to various cardiac failures. The result of the recent studies, which can provide certain framework for the current-structure relation in the ventricular wall and can be interpreted through MCG-data, can be stated with 4 general observations.

1. The remarkable and established fact is that electrophysiological properties of the ventricular myocardium are extremely heterogeneous and dispersion of repolarization may be an important factor that determines the manifestation of the heterogeneous ion channel function and expression. A variation in action potential duration (APD) creates the dispersion of repolarization and the baseline level of APD differences exists even in a normal myocardium [2]. Electrical differences which are the result of the difference in the recovery rates of the transient outward current are most notable between the epicardium, midmyocardium and endocardium. Repolarization begins when the net current over the AP plateau becomes outward and several studies have indicated that a large gradient in density and rate-dependent properties of the transient outward current exist in different layers of the ventricular wall [2, 3]. This current has been suggested to contribute significantly to regional electrophysiological heterogeneity and to cause electrical gradients across the ventricular wall [4]. It has been proved that electrophysiological changes of ischemia induced regional shortening of APD to a significantly greater extent than that produced by cycle length changes [5, 6].

2. In the recent years, major advances were made in understanding that the myocardium cannot be considered electrically as a continuous medium. In contrast to the previous long-standing belief it has become accepted that the myocardium is structured to discontinuous activation and recovery. Structure affects not only the shape of the local action potential, but also the underlying ion membrane currents. There are numerous previous studies available in the literature that suggested the effect of myocardial fibers geometry on the current flow patterns, epicardial and torso potentials [7, 8]. The ventricular wall consists of discrete muscle layers that follow a curving radial path from subendocardium to the subepicardium. The adjacent layers are electrically insulated and make contact only via direct muscle branches. The anisotropic arrangement of the cardiac muscle can be described with band-line structure wrapping left and right ventricles. In pathologic cases this basic structure may be disturbed [9]. Experimental results and mathematical simulations show that important anatomical factors of the ventricular walls that affect propagation and recovery are: the elongated shape of myocardial fibers; the epi-endocardial rotation

of fiber direction; the epi-endocardial obliqueness of the fibers [10]. A key feature of this arrangement is that transmural rotation of fibers and the laminar architecture of the ventricular wall can affect electro-potential and magnetic data.

3. The modeling study by Kazutaxa Gima and Xoran Rudy [11] establish a direct and specific relationship between cellular ionic processes, the APD, and the morphology of electrocardiographic wave forms. The results show that transmural slow-delayed rectifier potassium current heterogeneity is the major determinant of T-wave morphology and the spatial gradient of the transmembrane potential during repolarization is determined by two factors: sequences of activation and local APD.

4. In physiological terms, at the cell level, the mechanic phenomena (change in the length and contraction intensity of muscles) could modify the electrical processes occurring at the membrane of cardiomyocytes through the direct impact onto the stretch-activated channels (SAC), that is ion channels, activated by stretching or, in different words, mechano-sensitive ion channels. SAC are activated by stretching, which means that the more cell membrane is being stretched, there is more chance for them to open. Cardiac mechano-sensitivity and its effect on electrical function undoubtelly form a very complex system. Mechanisms and pathways whereby mechanical events, changes in tension and force, and spatial displacement alter the hearts electrical properties are now recognized as an important dimension for development of new approaches in therapeutic cardiac control. Mechano-electric coupling or feedback (MEF) has only recently began to be explored as a topic of medical interest. We now suspect MEF to play a role in both electrical and mechanical pathological remodeling. Arrhythmogenesis by MEF is likely to go undetected in many patients, because no tool exist to identify and measure these effects. The body surface electrocardiogram, for example, is notoriously inept at detecting slow, local depolarization. MCG may be a more useful approach.

Based on this latest knowledge we can assume that the heterogeneity of an action potential is caused by an intramural heterogeneity of a current flow and for each time instant a result of the "inverse problem solution" can display a resulting current density vectors, whose quantity and direction correspond a quite particular allocation of outward current densities at a certain level (depth) and reflect the architecture of the fiber through which the current propagates. However, in fact, the map of the imaged current density is only a xy-projected picture on the frontal plane of the human heart, whereas in reality the flow of the local circuit currents is three-dimensional in various depth, with relevance to cardiac anatomy and physiology. The discontinuities in tissue architecture affect the amount and direction of the local outward current flow. Dispersion of repolarization and, accordingly, outward currents, are dynamically modified by the restitution properties of individual myocytes and cell layers, heart rate and the direction of condition. Different pathological conditions can affect this electrical heterogeneity. Several studies reported that the density of the transient outward current may be subject to alterations during ischemia [12], in cardiac hypertrophy or failure [13], after myocardial infarction [14]. That is why our focus should be on the ionic mechanisms that contribute to the intramural nonuniformity of cellular repolarization at certain depth of myocardium and on intramural current heterogeneity as a basis for identifying patients at risk and for assessing the effects of intervention (eg, drug treatment) on the degree of heterogeneity. In the electrophysiologic view, a frequent change of the direction of the current densities vector may be interpreted as a high degree of heterogeneity inside a certain tissue region. A local shortening of the current flow duration in the area of abnormal perfusion can be an independent marker of early localized myocardial ischemia. MCG has been around for over 40 years but only recently the significant progress in instrumentation has increased the interest in the use of MCG in clinical cardiology. It is necessary to note that significant progress in the electronic MCG signal imaging technology, both in terms of hardware and software, as well as mathematical and physical modeling over the past 10 years have made for the turning point. The major problem was that a MCG-device should be operative in unshielded clinical rooms. Developments of new algorithms and hardware for the electronic balance and adaptive filtration have improved noise suppression techniques and increased the noise immunity of MCG-devices. The new methods of the data analysis and effective technical solutions were applied during numerous clinical examinations.

2. WHY DO SCIENTISTS CONTINUE TO DEVELOP MCG FOR DIAGNOSING CARDIAC DISORDERS WHEN SO MANY ALTERNATIVE TOOLS ARE AVAILABLE?

There exist several ways to answer this question, but the essence is the following. It is known that the current density and magnetic field are related by the law of Biot and Savart. That means, that the information about the current density source distribution should be present in a measured magnetic field. Using SQUID technology for measuring the magnetic field of the heart we gain a unique opportunity to identify

changes in the current density that constitute the basis of the myocardium electric activity. The first motivation for scientists is to visualize the distribution pattern of the current sources and to clarify how well these representations reflect the reality. The second motivation is to answer the question:" Whether or not MCG-study can add something new to the diagnostic information gained from the standard clinical tests?" And, then, which of the methods can be chosen as the reference?

Body Surface Potential Maps (BSPM) appear the most likely candidate for the comparison because most authors agree that "full" BSPM will provide identical information. However, BSPM reconstruction is highly sensitive to geometrical errors, potential measurement errors and computer algorithms used. In many cases epicardial potential solution as the result of BSPM study "have been unsatisfactory" [15]. It is especially essential with regard to the repolarization analysis. Although the coronary angiogram has obvious limitations, in the diagnosis of CAD it remains the clinical "gold standard" in the case of the sufficient luminal occlusion. Exercise ECG test has high sensitivity only in patients with three-vessel disease and its diagnostic performance is under the influence of baseline ECG abnormalities and is generally less than imaging procedures. Stress echocardiography has high sensitivity and specificity in patients with chronic ischemic dysfunction. SPECT imaging is used for the detection of myocardial viability as the ability of the myocardium to retain thallium-201. PET imaging is an accepted method for the detection of preserved metabolic activity in myocardial regions with reduced blood flow. The listed above diagnostic performances of many currently available techniques show that they cannot reflect the data that MCG is capable of recoding.

There is a direction independent from the clinical practice that deserves special attention connected with the development of the new methods of revealing cardiotoxic medications. In correspondence to the regulatory documents of the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) there was set forward an imperative need to test non-anti-arrhythmic medications in order to reveal their potential in extending QT interval and even to affect the length of QT(QTc) interval. To meet these requirements there is a need to conduct a large series of QT/QTc measurements in animals and people at the pre-clinical and clinical stages of drug development and launch. The safety of the future consumers of new medications and the economic impact that are of concern to pharmaceutical companies set forward the issues of precision and repeatability of the results obtained for QT(QTc) interval measurements. Up to present 12-electrode ECG was considered the only possible means of such measurements. Although many would agree that in-precision in the positioning of the electrodes, the alterations of the contact resistance between the electrode and the skin and a whole seriws of other limitations related to the shape of T wave couls significantly impact the results of such measurements. On the other hand, the preliminary results of applying MCG to perform similar tests on animals and people with the use of pharmacological stress-test showeed impressive results. It is evident that if we want to use MCG "only when nothing else will suffice", our focus should be on the various disorders of the heart where changes of ion current densities are the dominant factor. There exist strong evidence that the electrophysiological behavior of the heart may be altered in ischaemia which causes abnormal mapping patterns during the repolarization phase. MCG-map abnormalities were detected in all patients with severe coronary lesion. Furthermore, during several patient examinations [16] significant changes were not observed in standard 12-lead ECG. And it is remarkable that the magnetic map changes in ventricular repolarization can be observed as early as in the results of healthy subject measurements during physical exercise or pharmacological stress [17, 18, 19]. In the study by Brocumeier [17] the dramatic influence of increased heart rate on repolarization magnetic mapping patterns was found for healthy volunteers. In contrast to MCG, significant stress-induced differences were not observed in ECG and BSPM - recordings. Many researchers agree on that "abnormal" mapping patterns are "the special properties of MCG such as the ability to detect so-called vortex currents (loop currents, injury currents)". Helmholz theorem, which decomposes a vector field into the flow and vortex parts [20] was the theoretical basis for interpretation of the magnetic map changes. Discussion that the information about myocardial electrical phenomena can be present in the biomagnetic field and absent in the electrical field have been well known since very first MCG measurements. Opportunity to display the "electrically silent" magnetic sources was demonstrated in theoretical study [21] with the example of the tissue that has a "spiral-like" or "helix-like" conductivity.

3. ADVANTAGES OF MAGNETOCARDIOGRAPHY VS. ELECARDIOGRAPHY

ECG and MCG are both the methods of non-invasive diagnostics of electrophysiological processes inside the heart that is conducted by registering the signal coming from the body surface and have many similartities. Electrocadiographic signals have

similar morphology in both types of registry. The waves of artrial activation, ventricular depolarization and ventricular repolarization are termed P, QRS and T, correspondingly, in both of the examination methods. Still, MCG has a number of fundamental and methodological differences from the ECG related to a series of signal-generating variables between the heart and the sensors at the body surface. First of all, the fundamental difference between the two methods of registering biological signals is that the connection between the electric potential and the current is conditioned by specific electric resistance of membranes and muscles that could depend upon time, direction, the measuring point and the voltage value. Important information about the current flow is lost in the electric potential. Potential theory states that the voltage between two points is independent of the path traveled between two points. At the same time, in case of magnetic mapping, the proportion factor between the magnetic field and the current is determined by fundamental physical constants.

The methodological differences can be put as follows:

1. Magnetic measurements are not only non-invasive but also non-contact. Thus, there is eliminated any appearance of artifacts related to unreliability and/or fluctuating of electrode contacts with the skin. MCG is more sensible towards intra- and extracellular activation currents, whereas chest leads of ECG (or BSPM) register the difference of potentials generated by secondary (wollume) currents directly beneath the skin inside the patient's body. The difference between these two types of registration can also be illustrated by facts such as registry of coronary activity of a fetus at certain pregnancy phases, when non-conductive layers of tissue intervene in ECG measurements of the fetus. Hence, MCG examination of fetuses became a rather promising area of MCG application. The non-contact measurements appear even more advantageous if applied for measuring coronary activity in animal models. Research, development and testing of medication and gene therapy require multiple phenotype examinations of animal models. ECG registrations, for example, in rodents, is possible only if the animals are anesthetized, otherwise they get over excited and the ECG would contain intolerable signal artifacts. Another pitfall is that cardiac rhythms of an anesthetized animal are not natural. Although alternative telemetry methods are applied frequently, they are rather time- and effort- consuming. It was demonstrated that MCG of an animal in its conscious and natural condition corresponds the most to normal physiological conditions.
2. It is known that the distribution of the wave fronts of the myocardium excitation and restoration moves from the endocardium to epicardium and backwards and normally is ensured by the prevalence of radial action currents. In a general case, the temporal and amplitude correlation between the radial and tangential components of the currents is determined by current-structure interaction inside the myocardium. Registering ECG potential signals gives the possibility to analyze the dynamic changes of predominantly the radial current components. By registering Z component of the heart magnetic field, in fact, the signals registered are related to the current that is tangent-directed relative to the measuring plane. It is evident, that abnormal alteration of the tangent component of the current demonstrates functional and/or pathological changes in the current-structure balance even in cases when the radial current components remain intact.
3. Another advantage along with the no contact procedure is the immobility and hence repeatability of the detector configuration. The regularity and repeatability of the positions of the measuring points of the grid overplays any of the electrode systems.
4. MCG takes account of the space components of the heart magnetic field that are measured as vector values, whereas in case of ECG the heart electric field is defined as scalar value. The new feature vs. the standard ECG is the transition from the registering of one-dimensional curves in time to MCG mapping (tracing of 2D dynamic maps of the magnetic field) that enables to visualize the electro-physiological substrate. The most topical MCG application is the 3D imaging of electro-physiological processes in case of arrhythmias that occur as the result of re-entry mechanism. According to the authors' proper observations and also those of certain other researchers, the patients affected with paroxysmal or persistent types of atrium tremor can show circular distribution of the current density vector even during the inter-paroxysm period. It is also noteworthy, that abnormal currents are registered in the period corresponding to the P wave at the surface ECG, which proves the atrial origin of the former.

4. ASSESSMENT OF THE LEVEL OF PROARRHYTHMIC HETEROGENEITY OF THE MYOCARDIUM

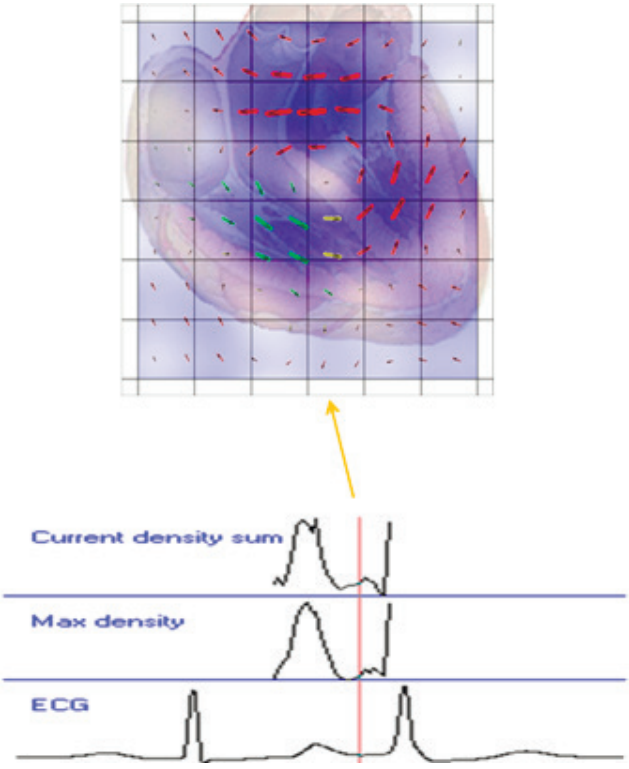
Sudden cardiac death is the most severe and immediate case of IHD that is most often connected to the ventricular tachyarrhythmias both of the ischemic and non-ischemic origin, that is why identification of the high risk patients' groups is of high importance. Similar to the standard 12-channel ECG, magnetocardiography allows to see the prolongation of QT interval, heterogeneity of de- and repolarization, calculate the variability of the cardiac rhythm. At the same time, MCG is more sensitive to the arrhythmogenic tangent currents and

identifies the electrically hidden eddy currents. It is known from certain sources that the autopsy of post-infarction patients affected by ventricular tachycardia often shows the areas of narrowed fibrosis-affected subendocardium that can be the source and the generator of such currents. The electric properties of the ventricular myocardium are extremely heterogeneous and the dispersion of repolarization can be an important factor that precondition the heterogeneous phenomena in the function of the ionic channels. The electrophysiological mechanism for the development of significant electric heterogeneity of repolarization in heart disease is not well understood. The changes in the action potential duration (APD) precondition the dispersion of repolarization, hence the initial level of APD differences exists even in the healthy myocardium. Electrical differences that are the result of the differences in the speed of renewal of the transitory outcoming ion fluxes that are most visible in-between the epicardium, the medium section of the myocardium (M-cells) and the endocardium. Results from a number of research demonstrated that high gradients of density and frequency-dependent properties of the transitory source current exist inside different layers of ventricle wall. It is known, that the principle singularity of an M-cell is its capacity to prolong the action potential compared to epi- and endocardial layers for the period of rhythm deceleration. According to data from different research, accumulation of M-type cells characterized by the most prolonged action potential is observed in the side wall along the distance from the subepicardium stratum up to the medium myocardium layer, inside the anterior wall in the subendocardium stratum up to the medium layer of myocardium, and along the whole area of left ventricle outflow tract. M-cells are also present inside the deep layers of papillary muscles, trabecules and the interventricular septum. The tissue sections obtained from M-areas showed the increased AP duration by 100msec compared to the sections of epicardium and endocardium for the 2000msec cycle or more. Although in case of normal electrophysiological properties, in the intact cardiac muscle the local differences in the AP duration are not registered by electro-potential methods due to the electrotonic connection between the cells and their layers. As the result of the difference in duration of the 3nd and 3rd phases of repolarization in the three types of cells, on the two sides from M-cells there develop electrically opposite gradients that are mostly responsible for forming the T wave. At the beginning of the T wave the epicardium is being repolarized and at its end – the M-cells. The final section of the epicardium repolarization coincides with the peak of the T wave, and repolarization of M-cells coincides with the end of T wave. This means that the action potential duration of M-cells terminates QT interval. At the same time, APD of the epicardium determines the QT wave interval. Hence, the interval Tapex-Tend can be used for the analysis of the transmural electrical heterogeneity of the repolarization inside the medium layer of the myocardium. C.Yan GX and C.Antzelevitch insist that it is the interval Tapex-Tend that reflects the transmural dispersion of refractoriness that can be related to the 2nd phase of re-entry [22]. The heterogeneity of the repolarization should be measured in diseased myocardial segments under physiological conditions by means of non-invasive imaging of cardiac electrogenesis with magnetic field mapping. Under these recording conditions the transmural heterogeneity of the repolarization in patients with ventricular extrasystolia (VE) would be greater than in similar patients without VE and would be associated with ventricular mechanical remodeling. MCG mapping creates the opportunity to identify myocardium segments affected by abnormally increased heterogeneity, which serves as an independent marker of high arrhythmogenic predisposition and of the increased risk of arrhythmia, specifically in case of ventricular tachycardia and ventricular fibrillation.

At the Tapex-Tend interval the following MCG parameters are being assessed: the direction angle of the current density, the angle shift of the maximum current density, deviation of the vector of maximum current density (VMCD), measured at every 10msec of repolarization. In the results, values for direction of the largest CDV, its deviation (16.4º ±1.2 vs. 5.06 º±0.9; $p<0.0001$) and shift (8.78 ± 0.67 vs. 4.71±1.2 sm; $p<0.01$) during the T wave-end interval differed significantly between the groups of patients with VE and without VE. So, transmural repolarization heterogeneity was greater ($p< 0.01$) in patients with VE than in those without VE. The patients with VE had significantly ($p<0.05$) reduced left ventricular systole-diastolic velocities (Sm 8.73 ±0.64 vs.11.06±0.56 sm/s; $p<0.01$, Em 10.6 ±0.81 vs.13.7 ±0.84 sm/s; $p<0.05$, Am 8.73 ±0.64 vs.11.07±0.56 sm/s; $p<0.05$), thickened interventricular septum (1.12±0.028 vs. 1.02±0.04sm;$p<0.05$) and also increased intra- (0.03±0.004 vs. 0.016±0.003s; $p<0.05$) and interventricular (0.037±0.005 vs. 0.022±0.003s; $p<0.05$) delay [49]. Increase in the values of the angle direction, deviation, and, especially, shift of VMCD at Tapex-Tend interval in patients affected by ventricular extrasystole are conditioned by the non-homogeneous distribution of ion fluxes under the conditions of defeated electrotonic connection between the cells and the layers. Obviously, the discontinuity in the myocardium tissue architecture affects the reflection of the density and direction of the local source currents. Dispersion of repolarization and, correspondingly, of

the source currents are dynamically modified by both the renewal properties of individual cardiomyocytes and cell layers and the frequency of cardiac contractions and the grading of the process. The substantiation of the above approaches is based on the notion that electrophysiological alternation of cells and their membranes is associated with remodeling after an ischemic attack or after a myocardium infarction and is active in the process of arrhythmogenesis and the development of 'electromechanical irresponsibility' in the areas of myocardial dysfunction. It is known that electrical remodeling antecedes the structural and geometrical changes in myocardium and this makes MCG more sensitive compared to other non-invasive methods in reflecting pathology processes that take place. The increased transmural heterogeneity of the repolarization, which can be tested by the newest non-invasive imaging technique, magnetocardiography, may lead to ventricular arrhythmia associated with slight (below the pathology margin) ventricular mechanical remodeling. To estimate the efficacy and the individual selection of anti-arrhythmic therapy, up till now the clinics apply electrophysiological examinations on a wide scale. Yet, results received from applying the method described herein show 30-70 per cent discrepancy vs. the clinical effect of long-term anti-arrhythmic therapy. Dynamic MCG examinations could help receive additional factors indicating the readiness of myocardium towards electrical destabilization and the risk of arrhythmia. Patients affected with ventricular dysfunctions show abnormalities in repolarization characterized by circular direction and revealed, correspondingly, at the interval of T wave. Identifying of the transmural dispersion of repolarization characterized by the abnormal current direction or the presence of additional currents at the interval Tapex-Tend gives the marker of increased risk in developing ventricular tachyarrhythmia. The conducted examinations also proved that MCG data correlate with the ECG data of high resolution. It was determined that patients with late potentials of ventricles or late potentials of atria show abnormalities at MCG expressed as increased heterogeneity of de- and repolarization. In this connection rather conspicuous are the results of examations conducted on patients affected with frequent ventricular extrasystole as the result of delayed after depolarization (DADs). Human ventricular cell studies have shown that the Na+/Ca2+ exchange current (INa/Ca) contribute to the transient sink current (Iti). Iti is responsible for the proarrhythmic delayed after-depolarizations (DADs). Although DADs are generally accepted to be Ca2+-dependent, the relationship between sarcoplasmic reticulum Ca2+ release and DAD amplitude has not been measured, partly because the underlying Ca2+-activated currents are hard to control. The overall objective of our study demonstrated the efficacy of MCG in the diagnosis of the Ca2+ overload in an area of the heart in patients showing DADs. Three MCG-based indices, namely direction of the largest CDV, total current density and maximum value of the current density vectors during T wave-Tend and electric diastole showed a significant difference between DADs patients and the control group. Although Ta-Te interval was shortened in patients presenting with DADs they had additional current density peak during electric diastole interval (fig.1.)

Figure 1. The patients presenting with DADs had additional current density peak during electric diastole interval



5. DIAGNOSIS OF MYOCARDIAL ISCHEMIA AND ASSESSMENT OF ITS INTENSITY

Studies of the diagnostic properties of MCG to identify ischemia and myocardial disorders started as early as in 70-s of last century. D. Cohen et al. [24] in 1975 carried out experiments on dogs in order to study ST segment after the occlusion of the coronary artery , and in 1983 they studied ST segment while the test was conducted with a physical load . It was noted that with the myocardial ischemia isoline and ST segment are moving in opposite direction. With GMI the shift of an isoline approximately equaled to that of ST. With exertional stenocardia shift of ST segment makes about 70% of that of an isoline. With subendocrinal ischemia the depression of ST segment

is seen, whereas with transmural myocardial ischemia ST segment is elevated. If left bundle branch block occurs the differences are not possible to assess. If pains occur behind a thorax with complete bundle branch block on ECG it is important to make an early diagnosis of acute coronary syndrome. Since then numerous research were carried out and various approaches developed, including morphology analysis of magnetic field maps, analysis of MC-curves, inverse problem solutions and analysis of current distributions with a number of indicators identified. For instance, in the last decade such indicators were proposed as ST-T integral and shifts in ST angle to assess the presence of myocardial ischemia and a pool where hemodynamically significant stenosis of a coronary artery can be identified.

J. Park et al. [25] proved better sensitivity and specificity of the MCG as against studies of I-troponin in patients before coronarography, which evidently is connected with earlier changes in repolarization. E.g. specificity and sensitivity of MCG made 93.5% and 86.9% accordingly, whereas those with studies of I-troponin made 37.5% and 56.8%. Density of transitory currents of action can change along with ischemia after distinct myocardial infarction, with myocardium hypertrophy etc. Local change of the duration of currents of action in the area of pathological perfusion can be an independent marker of developing myocardial ischemia. MCG studies are essential of intramural inhomogeneity of excitation and restoration of myocardium so as to diagnose, predict the course of disease and assess how effective is the treatment.

K. Tolstrup et al. [26] were comparing MCG characteristics and positive and negative predictive value (PPV and NPV) of the results of stress single photon tomography (SPECT), MCG and ECG in 75 patients before coronarography. Symptoms, pain in thorax, level of I-troponin were examined in each patient. The account was taken of age, sex, presence of hypercholesterinemia, hypertension, diabetes, myocardial infarction, and coronary ventriculography (CVG) in the anamnesis. Results of examinations along with the indicated characteristics demonstrated high specificity and sensitivity, PPV and NPV of the method were 85.7%, 87.1%, 64.3% and 95.7% accordingly. Changes in depolarization and repolarization processes caused by metabolic dysfunctions in viable myocardium are not always registered by surface ECG. In patients with IHD, acute myocardial infarction the load testing is informative and has proved prognostic value, although it is connected with certain limitations and contraindications. Therefore, MCG as an non-invasive technique, application of which does not require loading and which furnishes information on electrophysiological processes in myocardium sensitive to ischemia, is an important and promising area in present cardiology. It is known that ischemia changes electrophysiological properties of myocardium and, in particular, results in regional differences of APD to a larger extent than tachycardia. To identify ischemia with MCG examinations the current density vectors of ST segment are mapped. Repolarization interval is conditionally divided in two subintervals (ST-Tapex and Tapex-Tend) in each of which three characteristics are considered (direction angle of vector of maximum current density, direction deviation of maximum current density vector). ST-Tapex interval is the most specific and sensitive to identify ischemia and evaluate forecast of the disease progress — 60 ms from point J to the peak of T wave which characterizes regional electric heterogeneity of myocardium in the "ischemia window". Clinical examinations showed that in patients with proved IHD spatial and time changes in current density vectors in the said interval differ from those in healthy individuals and progress depending on the graveness of the disease. Thus, total deviation of current density vector by ST- Tapex makes in average 2,5˚ in healthy individuals. In patients with acute myocardial infarctions and positive stress-test it increases up to 10˚ and more. Let us analyze Δ-RTapex, the new MCG parameter which we proposed for the first time. It is calculated as a difference between direction angles of CDV of the peak of T-wave and R-wave. α-Tapex corresponds to the basic direction of electric activity of a heart during repolarization and α-R during depolarization. Presence of residual ischemia in patients (pts) with acute myocardial infarction (AMI) may result from failed or incomplete revascularization or it may associated with inadequate tissue perfusion and no-reflow phenomena [27-29]. Hence, value of detection of viable myocardium susceptible to ischemia early after AMI could not be overestimated. It is important for reconsidering treatment plan for more aggressive medical management or referral of AMI pts to cardiac catheterization [28]. De- and repolarization abnormalities associated with reversible metabolic differences in viable myocardium are not always detectable by means of resting ECG. Stress testing have established prognostic value and may help to reveal ischemic differences which are likely to be associated with abnormal myocardial perfusion [30-32]. Despite convenience and accessibility of this methodology there are certain limitations and contraindications, especially early after AMI [31]. Therefore we focused on development of risk-free non-invasive method which would be able to provide information on electrophysiological properties of myocardium susceptible to ischemia. It was reported in numerous studies that MCG is safe and useful for assessment of pts with coronary artery disease and

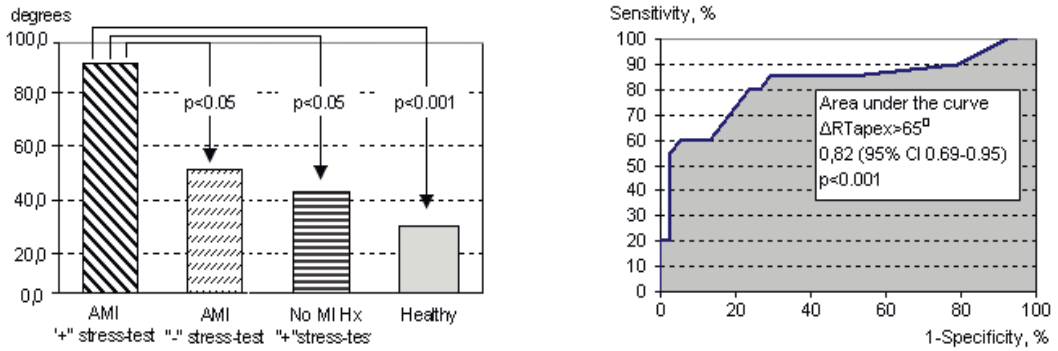
may locate myocardial damage after MI but data on assessment of pts with acute ST-segment elevation MI (STEMI) in terms of detection of electrophysiological differences in viable underperfused myocardium is still lacking. Of MCG parameters directions of main vector of current density distributions (VCDD) on T-apex (α-Tapex) and differences in directions of VCDD on R and Tapex (Δ-RTapex) were analyzed . Presence of signs of ischemic differences in AMI pts were assessed using treadmill testing on 7-10 day after AMI. EchoCG, MCG-mapping and exercise ECG were performed within 24-hours period. Additionally signal-averaged high resolution ECG was performed on in pts with AMI and positive stress test and in AMI pts without ischemic changes on stress test. Dispersion of descending part of T-wave was measured and corrected for heart rate using Basett's formula (cTa-Te). Parameters were compared using ANOVA with post-hoc tests after assessment for normality of distributions and equality of variances. Statistical analyses were performed using SPSS 10.0. Our study revealed that abnormalities in electrophysiological properties of myocardium were most pronounced in STEMI pts with positive stress ECG. Δ-RTapex was highest in the patients with AMI and positive stress test (90.8±10.7 degrees) compared to other patients: 51.6±12.4 degrees in AMI pts without ischemic changes on stress test, 43.0±4.5 in CAD pts without MI history and 30.0±16.4 degrees in healthy (fig.2). We have assumed that AMI patients who developed ischemic changes in stress ECG were most likely to have viable underperfused myocardium. Hence, we evaluated sensitivity and specificity of MCG parameters using stress-ECG data as a standard. It was detected that parameter Δ-RTapex >650 had 70% sensitivity and 82% specificity for detection of electrophysiological changes in viable myocardium susceptible to ischemia. ROC-curve was informative of area under the curve of 0.82 (95% CI 0.69 to 0.95) indicative of a good diagnostic accuracy of Δ-RTapex (fig.2).

Parameter α-Tapex was significantly higher in STEMI pts parameter with positive stress-test compared to healthy (149.0 vs. 41.8 degrees, p<0.05) but did not differ significantly between the other groups. This parameter did not have sufficient diagnostic accuracy (area under the ROC-curve 0.52, p=ns). Parameter α-Tapex corresponds to direction of VCDD during repolarization, reflecting main orientation of electrical activity of the heart during repolarization. Δ-RTapex considers differences in directions of VCDD during de- and repolarization, thus is different from α-Tapex and may reflect concept of "ventricular gradient" [33]. It is known that de- and repolarization are synchronized, determined and provide well-coordinated contraction and relaxation of cardiac myocites. Desynchronization of de- and repolarization may occur under conditions of ischemia, injury and inadequate perfusion of myocardium. We consider that Δ-RTapex may reflect this process. Gradual increase of this parameter in study groups depending of presence of ischemia and myocardial injury may prove this hypothesis. As our study revealed Δ-RTapex was significantly correlated with cTa-Te in the patients with AMI and positive stress test. This may be a result of increased transmural dispersion of repolarization in AMI patients with signs of ischemia and indicated that these pts are under higher risk of development of cardiac arrhythmias.

6. CONCLUSIONS

Magnetocardiography has the potential to make a valuable contribution in basic examination and analysis of biosignals of a heart, in particular whilst all vector components are used, vast spatial coverage and excellent signal quality. Browsing the data for the sake of reliability by QT-interval can be useful for the better reproducibility of high performance MCG. Improvement of the signal analysis and visualization technique will be essential for better view of the method. Magnetocardiogram of a fetus and models of animals possesses solid advantages and soon can be implemented. Depending on the results of recent clinical tests first applications can become available for the routine diagnostic examinations.

Figure 2. а- Parameter Δ-RTapex in study groups; в- ROC-curve for Δ-RTapex>650



MCG in therapeutic practice can be use to address the following objectives: a) determining presence and intensity of myocardial ischemia, including that at an early stage. It is shown that MCG at rest has high sensitivity to chronic IHD even in patients with stable or slightly changed ECG at rest; MCG examination helps to realize if there are indications for medical antianginal therapy, specify indications for coronaroangiography; b) assess effectiveness of antianginal therapy, including period after cardiac infarction. The examination helps to determine change of dose or antianginal medicine; c) assess the risk of paroxysm of ventricular tachycardia. The examination allows to selecting individual regime of antiarythmic therapy, specify indications for invasive electrophysiological examination (EPE); d) objectivize presence of cardiac deficiency (CD). Examination helps to assess electrophysiological differences caused by CD at preclinic or early stage of the disease, haelps to make unbiased and timely assessment of intoxication by cardiac glycosides. To address these objectives it is possible to employ unique qualitative and quantitative criteria diagnostic sensitivity of which makes from 70% to 95%, specificity from 60% to 90%.

REFERENCES

1. Pesola K, Nenonen J, Fenici R, Lötjönen J, Mäkijärvi M, Fenici P, Korhonen P, Lauerma K, Valkonen M, Toivonen L, Katila T. Bioelectromagnetic localization of a pacing catheter in the heart. Phys.Med.Biol. 1999; 44-10: 2565- 2578.
2. Viswanathan PC, Shaw RM, Rudy Y. Effects of IKr and IKs Heterogeneity on action potential duration and its rate dependence: a simulation study. Circulation. 1999; 99-18: 2466 – 2474.
3. Lukas A, Antzelevitch C. Differences in the electrophysiological response of canine ventricular epicardium and endocardium to ischemia. Role of the transient outward current. Circulation. 1993; 88-6: 2903-2915.
4. Näbauer M, Beuckelmann DJ, Uberfuhr P, Steinbeck G. Regional Differences in Current Density and Rate Dependent Properties of the Transient Outward Current in Subepicardial and Subendocardial Myocytes of Human Left Ventricle. Circulation. 1996; 93-1: 168-177.
5. John RM, Taggart PI, Sutton PM, Ell PJ, Swanton H. The interrelation between the monophasic action potential duration, cycle length and ischaemia in the human left ventricle. Eur Heart J. 1992; 13-3: 310-315.
6. John RM, Taggart PI, Sutton PM, Costa DC, Ell PJ, Swanton H. Endocardial monophasic action potential recordings for the detection of myocardial ischemia in man: a study using atrial pacing stress and myocardial perfusion scintigraphy. Am Heart J. 1991; 122-6: 1599-1609.
7. C. Ramon, Y. Wang, J. Haueisen, P. Schimpf,Effect of myocardial anisotropy on the torso current flow patterns, potentials and magnetic fields, Phys.Med.Biol.,45, p.1141-1150 (2000)
8. R.Plonsey, An evaluation of several cardiac activation models, J.Electrocardiol. 7, p.237-244 (1974)
9. P.Schmid, P. Niederes, P.P. Lunkenheimer. The anisitroptic structure of the human left and right ventricles. Technol Health Care. Apr,5(1-2), p. 29-43 (1997)
10. B. Taccardi, R.L. Lux, P.R. Ershier, R. Mac Leod, T.J. Dustman, N.Ingebrictsen, Anatomical architecture and electrical activity of the heart. Acta Cardiol,52(2), p. 91-105 (1997)
11. Kazutaxa Gima, Xoral Rudy, Ionic Current Basis of Electrocardiographic Waveforms, A Model Study, Circulation Research, May 3,p. 889-896 (2002)
12. G.K. Pike, A.H. Bretag, M.L.Roberts, Modification of the transient outward current of rat atrial myocytes by metabolic inhibition and oxidant stress. J Physiol (Lond). 470, p.365 –382 (1993)
13. R.E. Teneick, K. Zhang, R.G. Harvey, A.L. Bassett. Enhanced functional expression of transient outward current in hypertrophied feline myocytes. Cardiovasc Drugs Ther.7, p. 611-619 (1993)
14. W.M. Lue, P.A. Boyden, Abnormal electrical properties of myocytes from chronically infracted canine heart: alterations in Vmax and the transient outward current. Circulation. 85, p. 1175-1188 (1992)
15. K.Pesola, T.Oostendorp, K.Nenonen. Uniform Double Layer Solutions for Magnetocardiographic and Body Surface Potential Mapping Data, Tohoku University Press, Resent Advances in Biomagnetism,p. 290- 293 (1999).
16. Chaikovsky I, Kohler J, Hecker T, Heiler B. Detection of coronary artery disease in patients with normal or unspecifically changed ECG on the basis of magnetocardiography. In: Biomag2000 Proceedings of the 12th International Conference on Biomagnetism. Helsinki: University of Technology, Espoo,p. 565-568,(2001)
17. K. Brockmeier, S. Comani, SN Erne. Magnetocardiography and exercise testing, J Electrocardiol, 27, p. 137- 142 (1994)
18. M. Flug, S. Achenbach, W. Moshage, J. Schubert, K. Bachmann. Bicycle ergometric stress in healthy probands: differences between magnetocardiography (2-plane measurement) and electrocardiography, Biomed Tech, 42 Suppl., 241-242 (1997)
19. M. Winklmaier, S. Achenbach, L. Trahms,. C. Pohle, W.G. Daniel, W. Moshage. Bicycle stress in healthy subjects: differences between ECG and biplane MCG, Med.Biol.Eng. Comput., 37, 1478-1479 (1999)
20. Plonsey R. Capability and limitations of electrocardiography and magnetocardiography. IEEE Trans Biomed Eng. 1972; 19: 239-244.
21. Roth BJ, Wikswo JP. Electrically silent magnetic field. Biophysical J. 1986; 50: 739-745.
22. G.X. Yan, C.Antzelevic, Cellular basis for the normal T wave and the electrocardiographic manifestations of long QT syndrome. Circulation, 98, p.1928-36 , (1998)
23. P. Korhonen, J. Montonen, M. Mäkijärvi, P. Endt, T. Katila, L. Toivonen, MCG intra-QRS fragmentation analysis in the identification of patients with sustained ventricular tachycardia after myocardial infarction. Pacing Clin Electrophysiol,24, p. 1179-186 (2001) .
24. D.Cohen, H.Hosaka Magnetic Field Produced by a Current Dipole Part II, J.Electrocardiology, Vol.9, p. 409- 417 (1976) .
25. P.Park, Hill, N.Chung, P.Hugenholtz, F.Jung, Magnetocardiography predicts coronary artery disease in patients with acute chest pain. Ann.Noninv.Electrocardiol. 2005: 10: 312- 323
26. Tolstrup K, Madsen BE, Ruiz JA, Greenwood SD, Camacho J, Siegel RJ, Gertzen HC, Park JW, Smars PA. Non-invasive resting magnetocardiographic imaging for the rapid detection of ischemia in subjects presenting with chest pain , Cardiology. 2006; 106-4: 270-276.
27. Acampa W, Spinelli L, Petretta M, De Lauro F, Ibello F, Cuocolo A. Prognostic value of myocardial ischemiain patients with uncomplicated acute myocardial infarction: direct comparison of stress echocardiography and myocardial perfusion imaging. J Nucl Med. 2005; 46-3: 417-423.

28. Antman EM, Anbe DT, Armstrong PW. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction-executive summary. A report of the ACC/AHA Task Force on Practice Guidelines.J.Am Coll Cardiol.44(3). p. 671-719 (2004)
29. J. Dahl, C. Altehoefer, P. Buchin, F.H. Sheehan, E.R. Schwarz, K.C. Koch, Effect of myocardial viability and coronary revascularization on clinical outcome and prognosis: a follow-up study of 161 patients with coronary heart disease. Z Kardiol. 85(11), p. 868-881 (1996) .
30. R.J. Gibbons, E.M. Antman, J.S. Alpert , American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Committee to Update the 1997 Exercise Testing Guidelines.ACC/AHA 2002 guideline update for exercise testing: summary article. A report of the ACC/AHA Task Force on Practice Guidelines. J Am Coll Cardiol. Oct 16,40(8), p.1531-1540 (2002).
31. J.R. Nielsen, H. Mickley, E.M. Damsgaard, A.Froland. Predischarge maximal exercise test identifies risk for cardiac death in patients with acute myocardial infarction . Am J Cardiol,65, p. 149-153 (1990)
32. N.Valeur, P.Clemmensen, K.Saunamaki, P.Grande; DANAMI-2 investigators. The Prgnostic value of pre-discharge exercise testing after myocardial infarction treated with either primary PCI or fibrinolysis: a DANAMI-2 substudy. Eur Heart J, 26, p. 119-127 (2005)
33. I. Kardys, J.A. Kors, I.M. van der Meer, A. Hofman, D.A. van der Kuip, J.C. Witteman.. Spatial QRD-T angle predicts cardiac death in a general population . Eur Heart J,24, p. 1357-1364 (2003)

PHYSICAL HEALTH CONSEQUENCES OF INDUCED ABORTION IN IRANIAN KURDISH WOMEN

Fariba Ebtekar [1]
http://orcid.org/0000-0003-1292-9274
Email: ebtekarf@gmail.com

Forouzan Lahoni [2]
http://orcid.org/0000-0003-4166-5503

[1] Department of midwifery, Faculty of Nursing and Midwifery, Kurdistan University of Medical Science, Sanandaj, Kurdistan, Iran
[2] Vice chancellor for Health, Kurdistan University of Medical Science, Sanandaj, Kurdistan, Iran

ASTRACT

INTRODUCTION

Induced abortion is a common response to an unintended pregnancy. Abortion is illegal in Iran, yet women go through the risks for various reasons. The purpose of this study was to explore the physical complications that are experienced by Kurdish women undergoing induced abortion.

METHODOLOGY

This study used a descriptive qualitative design. Twenty women were recruited through purposive sampling method from the maternity and family planning units in health-care centers in Sanandaj, Iran. The participants with history of at least one induced abortion were interviewed in-depth for their abortion experiences either at the health center or in their homes. All interviews were tape recorded, with consent, and transcribed verbatim before carrying out thematic analysis. Trustworthiness was ensured through member checks, peer examination, and a documentation of an audit trail of the research activities.

RESULTS

Two themes, early-abortion complications and late-abortion complications, emerged from the data analysis regarding the women's physical health complications.

CONCLUSION

This study revealed that the induced abortion had negative effects on Kurdish women's physical health. Findings from this study suggest that midwives must take responsibility of effectively counseling couples before and after induced abortion, which may be performed for a variety of reasons. Post-abortion care for women with physical needs is also crucial.

KEYWORDS: Qualitative research, Induced Abortion, Women, Physical health, Consequences

INTRODUCTION

Induced abortion is the termination of a pregnancy before the 20th week of gestation at the woman's request for reasons other than maternal health or fetal disease [1]. It is a public health problem in the worldwide. Induced abortion can affect different aspects of women's well-being and their quality of life [2]. Women may experience different types of physical, psychological, and social effects of abortion [3, 4]. Of greater importance is the fact that it can cause long-term sexual and reproductive ill health [5]. Experience, particularly in developing countries where it performed illegally and there is the fear of the legal repercussion and social stigma [6]. Abortion is illegal in Iran except in cases where the woman's life is at risk or cases of fetal impairment [7]. Until now, little is known about the issues relating to the induced abortion in Iran and Iranian Kurdish women's experiences of induced abortion. Therefore, it is of paramount importance to conduct a study in the cultural and social context of Kurdish women in Iran. This could then assist in gaining a better insight into how the health of women is affected by abortion. So, the aim of this qualitative study is to explore the physical complications that are experienced by Kurdish women undergoing induced abortion. Such knowledge can be useful in the prevention of unintended pregnancy and unsafe abortion.

METHODOLOGY

The study followed a descriptive qualitative approach towards exploring the physical health complications of Kurdish women who had an illegal, induced abortion. The research took place over a seven-month period at the health-care centers of the Kurdistan University of Medical Sciences in Sanandaj, the centre of the Kurdistan province in the western part of Iran. Twenty women were recruited through purposive sampling method from the maternity and family planning units in ten health-care centers. Before contacting potential participants, the researcher oriented midwives at the maternity and family planning units of the selected healthcare centers on the required criteria for choosing participants. Once identified, the midwives explained the purpose of the study and the interview process to the women. Inclusion criteria into the study were being a Kurdish married woman, having an experience of illegal one year before the interview and settled in Sanandaj, absence of mental disability, and the ability and willingness to describe their experiences. Subsequently, appointments for interviews between the researcher and the selected participants were arranged. Participants were interviewed based on the date, time and place most convenient for them. The participants were interviewed in-depth for their abortion experiences either at the health center or in their homes.

All interviews were conducted in the Kurdish language by the first author who is a midwife. Each interview was tape-recorded with the woman's permission. Each interview lasted for 1-2h. All interviews were transcribed verbatim in the Kurdish

language and reconciled with the notes taken by the first researcher. Transcription accuracy was checked by a colleague who read randomly chosen transcripts while listening to the audiotape. The analysis was also undertaken from the Kurdish transcripts and only verbatim quotations presented in the writing for publication were translated into English. A thematic analysis was used to analyse the women's experiences of induced abortion. For each of the twenty women the following procedure was followed; bracketing, delineating units of meaning, clustering of units of meaning to form themes, summarizing, validating and modifying each interview if necessary, and extracting general and unique themes from all the interviews and making a composite summary. Trustworthiness was ensured through member checks, peer examination, and a documentation of an audit trail of the research activities.

ETHICAL CONSIDERATIONS

Permission to conduct the study was received from the Faculty of Medicine and Health Sciences of the University Putra Malaysia and Kurdistan University of Medical Sciences. The participants were informed of the purpose of the study, assured of confidentiality at the beginning of each individual interview and provided verbal consent. All participants were informed that their participation in the study was voluntary and that their real names would remain confidential. They were also reassured that their care would not be affected if they chose not to participate in the study. Moreover, they could withdraw from the study at any stage without offering explanations.

RESULTS

The ages of the participants ranged from 19 to 41 years at the time of abortion, with an average of 32 years. Majority (60%) of women had diploma or university certificate and 75% were housewives. Two women were nulliparous, four were primipareous and fourteen women were multiparous. Multiparous women had between two to three children at the time of abortion. All the participants were married. On the occasion of the abortion, the fetus' gestational age ranged between 5 and 12 weeks based on sonography. The technique for abortion was medical in most of the cases and was carried out with prostaglandin that had been used alone as vaginal suppositories or as intramuscular injections of a dose of prostaglandin or several doses of this drug. One of the participants had used an unsafe herbal stem and the remaining of the women had curettage. The medical abortion process was started in the abortion provider's office or the woman's house. Dilation and curettage were conducted in an abortion provider's office and the traditional method process was started in a traditional healer's house. Two themes "early-abortion complications" and "late-abortion complications" were derived from the data analysis.

EARLY - ABORTION COMPLICATIONS

Early abortion complications refer to the side effects caused by the use of abortion methods which the women experienced during the beginning stage of the abortion procedure. All women experienced at least some kind of early abortion complications that most commonly related to the medical methods of abortion. Common physical complications experienced by the women who used prostaglandin, which is a medical method of abortion, were intense pain, nausea, vomiting, diarrhea and spotting. These women stated that the pain they experienced was much more severe than anticipated. Profuse sweating during the pain was also reported by all prostaglandin users. They argued that they did some physical exercises such as jumping, trekking, jogging and skipping in order to speed up the abortion as advised by the provider, which also aggravated the pain. The women stated they did not resort to pain reliefs because the provider did not recommend them.

A nulliparous woman, who had no experience of labor pain, injected herself with prostaglandin intramuscularly in an attempt to abort her pregnancy despite her lack of prior knowledge of injection, after attempts to solicit the service of termed specialist failed. She had injected two vials of prostaglandin but her attempts were unsuccessful. More so, she then approached a provider for another two vials after one week, when the first injection had failed and she experienced pain twice. Dilating on the experience, she mentioned:

"After a few minutes of injection, I had lower abdominal pain which lasted for about six hours. The pain was very sharp and strange beyond imagination. It seemed like somebody was beating my abdomen with a spade or fork. It was so horrible that I hit almost everything that came my way. I hit my husband, wall, table and sofa. I threw out the table breaking the glass into pieces. I bite and grasped the sofa ... I have never been in such awful pain in my life. It was a terrible experience."

A few women who used the surgical method and a woman who attempted an abortion by inserting a herbal stem in the vagina also experienced pain during the abortion process. This pain, they mentioned, was due to the fact that the abortion provider did not inject them with any anesthetic before carrying out the procedure.

"The doctor didn't give me any anesthetic before starting the abortion. She also put so many different instruments into my uterus which caused serious abdominal pain. I kept screaming and wailing at her. I later couldn't talk and felt numbness in my fingers. I sensed my blood pressure drastically fell. I never experienced such a pain ever since", stated a woman who underwent dilation and curettage.

All women who used prostaglandin also stated that they had diarrhea, nausea and vomiting after using prostaglandin which lasted for a few hours for some and up to a day for few others. A woman described her experience as follows:

"After the injection, the drug instantly induced pain in me, which resulted in diarrhea and vomiting soon after I left the abortion provider's office … Then an hour after reaching home, this pain, vomiting and diarrhea became persistent and made me discomfort."

Most of the participants cited that they had used the herbal methods before using the prostaglandin or surgical methods. The reason for this change from herbal to conventional methods, they mentioned, was because the former failed to terminate their pregnancy. Despite this failure, the women reported they had experienced nausea and vomiting due to herbal use.

"I boiled a kilogram of onion and drank it all … A few days later, I repeated the same. I then felt a burn-like pain from my nose down to my stomach. I also experienced nausea and frequent vomiting during the period … It was a difficult moment", said one participant.

"A neighbor took me to a female traditional healer who inserted a piece of herbal stem into my vagina and told me to leave it there until the abortion began … At home, I began to vomit, which continued to the following day with spotting, fever and loss of appetite. When the situation persisted, I went to the hospital and was admitted. Due to the infection, the doctor performed curettage which terminated my pregnancy. I was admitted for another three days after abortion because of the infection….", said another participant.

Another side effect reported by all the women who used prostaglandin was spotting. These women mentioned that only light bleeding was experienced initially, which gradually increased to more than menstrual bleeding. The women mentioned that they unprepared for the quantity of bleeding.
One of these, after realizing that her IUD failed to prevent her from being pregnant, removed it by herself in an attempt to abort the pregnancy. She also used a prostaglandin suppository prescribed by a friend, after realizing that these attempts were all unsuccessful. In her own words:

"A day after inserting three tablets of prostaglandin into my cervix, I experienced spotting which lasted for a week. I later realized that the tablets did not abort my pregnancy. Then I took an intramuscular injection of prostaglandin after which I experienced severe pain and heavy bleeding with clot which lasted for a full night.

LATE - ABORTION COMPLICATIONS

In this study, late-abortion complications refer to the side effects of abortion which the women have experienced since abortion up to one month. Almost all women experienced these complications. The most commonly post-abortion complications reported by the women who used surgical or medical method include spotting, vaginal bleeding, pain and incomplete abortion.
Women who had experienced spotting reported that it persisted for a number of days ranging from a week to twenty days, before gradually increasing to more than regular menstrual bleeding which lasted for a few hours for some women and up to two days for others.

"A few days after being injected with the prostaglandin, a solid lump came out with blood; followed by spotting for about twenty days. I thought it was natural and didn't go to see a doctor … This was followed by a day of heavy bleeding and intense pain.
"I went to the hospital … I was informed that I would be admitted, with which I disagreed at my own risk. When I returned home, the bleeding continued", stated a participant.

One of the complications reported by most of women who used surgical or medical method was incomplete abortion. Incomplete abortion entails the incomplete expulsion of the remains of the pregnancy from the uterus that requires a repeat abortion. A woman who was injected with prostaglandin by a herbal medical store staff, experienced persistent spotting and bleeding due to an incomplete abortion. This woman mentioned that after the injection, a lump of flesh and blood came out of her, which made her happy because she thought she successfully aborted the pregnancy. Five days later, she went to a health center to get a contraceptive (progesterone ampoule). A few days after she was injected with the progesterone ampoule, she experienced a persistent spotting which compelled her to go to the clinic for sonography ten days later, and was told that the abortion was incomplete. She related:

"The doctor said I should undergo curettage which I did not accept because I didn't want my family to be aware of the pregnancy. Then the doctor prescribed prostaglandin suppository which also failed to complete the abortion, and the spotting was still persistent. Eleven days after using the prostaglandin suppository, I had severe vaginal bleeding and clotting which continued for two days. At last when I lost a lot of blood, I became weak and dizzy, which forced me to go to hospital for treatment."

These women reported they also experienced intense pain which usually accompanied clotting and bleeding. This pain, they mentioned, was experienced before, during and after treatment of incomplete abortion. One of the participants who used an injection of prostaglandin mentioned:

"During my incomplete abortion, I encountered untold pain and suffering. The pain was so grave that I became very nervous and even screamed in the hospital ward. The pain persisted even after taking some pain killers from the health care staff."

Furthermore, the women also admitted that their complications necessitated post-abortion treatment but due to the illegality of abortion, they never went to the hospital until the situation became severe which often resulted in hospitalization.

"After the dilation and curettage by the doctor, I experienced spotting and bleeding which lasted for twenty days. Initially, I didn't take it seriously because I thought it was usual for a woman who just underwent an abortion. Then I went to see a doctor who prescribed sonography. The sonography showed that the pregnancy was not fully aborted. This compelled me to do another curettage which completed the abortion" explained one participant.

DISCUSSION

The finding of this study showed that due to the illegality and unavailability of safe abortion services, Kurdish women were compelled by circumstances to resort to any available means of abortion relayed to them usually through word of mouth by friends and relatives. Some women had to travel to big cities to get the procedure and paid a large amount of money for it. Almost all women stated that they had a lack of knowledge about the abortion methods and they obtained the abortion methods from unskilled personnel with no counseling. These abortion methods resulted in numerous complications. In countries where abortion is prohibited or where access to safe medical facilities is limited, women resort to unsafe abortion to terminate their unintended [8]. Abortion-related stigma and the environment created by the stigma could influence these women to do abortion with the dangerous methods that they do not have adequate knowledge about them [9, 10]. In places that abortion is highly stigmatized, women seek the services without good advice [11]. In this situation, misinformation is widespread and women often use ineffective methods. Therefore, this misinformation can cause women to expose themselves to unnecessary risk and experience serious complications.

Finding of the investigation showed that women experienced spotting, bleeding and incomplete abortion. Similar studies also reported that women experienced complications including hemorrhage and incomplete abortion. These phenomena are most peculiar to countries with restrictions on access to safe induced abortion, where stigma and negative social attitudes compel women to undergo abortion in dangerous conditions and there is no follow- up care after abortion [12, 13] as compared to countries which legalized abortion, where majority of the abortion cases were reported to be safe and successful [14, 15]. The finding of the study also revealed that the most abortion complications were caused by medical method. The similar result in Mexico where women attempted to self-induced their abortion by taking misoprostol, although, they did not know how to use it and even providers such as pharmacists did not know the exact doses required [16]. In contrast, reported that in countries, where abortion is performed legally, through the use of medical methods abortions are effective and safe [17].

The results of this study also revealed that abortion was a painful experience for the majority of women. It should be noted that although pain from the abortion could be caused by the procedure but, another possible explanation for this finding could be the psychosomatic side effects of their induced abortion. The illegality and stigma attached to abortion could exert psychological and emotional pressures on the women and this, in turn, can intensify their physical pain. Also hypothesized, significant ambivalence, emotional distress and/or personal circumstances can afflict women's physical and psychological conditions [14].

Among the early-abortion compilations, as reported by the women, were nausea, vomiting, diarrhea, fever and spotting. Also, in Iran's study showed that systemic side effects including nausea, vomiting, diarrhea and lower abdominal cramps were seen in 61% of the cases used prostaglandin for abortion [18]. Similarly, in a study in Nigeria found that women who tried to attempt to do the abortion by using pills and traditional herbs experienced pain, bleeding, fever and injuries to their genitalia systems [9].

These complications were more intolerable to the Kurdish women due to lack of social support, limited prior knowledge about the side effects and their fear of illegality and social judgment compared with women in the countries where abortion is legal and safe; who were generally more prepared for the experience [14]. Moreover, study in Uruguay showed that counseling before and after abortion reduced possible risks related to induced abortion for women who undergone an illegal abortion [19].

This study showed that when complications occurred the women delayed seeking care they urgently needed. The reasons given for this delay all reflected fears of negative attitudes of health providers and social judgments of abortion. However, in some cases, women were not informed about side effects. Therefore, women had to strike a balance between the sacrifices deemed necessary in protecting their health and their desire to both control the process and minimize social recognition. Several other studies have also shown that in countries where there is a stigma around abortion, women often suffer abortion complications silently in their homes until they are in extremely critical conditions. This situation, leads to delayed abortion care [10, 20]; severe physical complications and a high financial cost treatment [21, 22]. In addition, Kurdish women reported that they were afraid to open up about their medical situation to the health care providers; hence it is possible that, as a result, the women did not get proper medical care. They may also be subjected to stigmatizing health care attitudes, resulting in negligence, lack of appropriate care and further morbidity [23]. From this, it seems that this aspect of post abortion care and health care services requires more attention.

CONCLUSION

This study revealed that the induced abortion had negative effects on Kurdish women's physical health. Findings from this study can be used by Iran's Health Ministry to review and revise its policy to include pre-abortion and post abortion counseling. Midwives must take responsibility of effectively counseling couples before and after induced abortion, which may be performed for a variety of reasons. They should also inform the women about potential health effects of induced abortion. Post-abortion care for women with physical needs is also crucial.

ACKNOWLEDGEMENTS

We would like to thank Kurdistan University of Medical Sciences and the Faculty of Medicine and Health Sciences of the University Putra Malaysia for their approval of the study (A part of PhD thesis). We also thank all the women who participated in this study.

REFERENCES

1. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. Williams Obstetrics (23rd ed.). USA. The McGraw-Hill Companies, Inc.; 2010.
2. World Health Organization. Unsafe abortion: Global and regional estimates of the incidence of unsafe abortion and associated mortality in 2003. WHO, Geneva, 2007.
3. Cohen SA. Abortion and mental health: myths and realities. Guttmacher Policy Review. 2006; 9-3: 8-12.
4. Shah I, Ahman E. Unsafe abortion in 2008: global and regional levels and trends. Reprod Health Matters. 2010; 18-36: 90-101.
5. Mary N, Mahmood TA. Preventing infective complications relating to induced abortion. Best Pract Res Clin Obstet Gynaecol. 2010; 24-4: 539-549.
6. Bahoh C. Examining the experiences of women who underwent illegal abortions pre Roe v. Wade. Doctoral dissertation, Alliant International University, USA. 2009.
7. Mohammad-Alizadeh S, Wahlström R, Vahidi R, Johansson A. Women's perceptions of quality of family planning services in Tabriz, Iran. Reprod Health Matters. 2009; 17-33: 171-180.
8. Sedgh G, Henshaw S, Singh S, Ahman E, Shah IH. Induced abortion: estimated rates and trends worldwide. Lancet. 2007; 370-9595: 1338-1345.
9. Henshaw SK, Adewole I, Singh S, Bankole A, Oye-Adeniran B, Hussain R. Severity and Cost of Unsafe Abortion Complications. Int Fam Plan Perspect. 2008; 34-1: 40-50.
10. McMurtrie SM, García SG, Wilson KS, Diaz-Olavarrieta C, Fawcett GM. Public opinion about abortion-related stigma among Mexican Catholics and implications for unsafe abortion. Int J Gynaecol Obstet. 2012; 118 - Suppl 2: S160–S166.
11. Shannon C, Winikoff B. Unsafe abortion and strategies to reduce its impact on women's lives. S. Kehole JP, Neilson JE Norman (Eds.). Maternal and Infant Deaths - Chasing. Millennium Goals 4 and 5. London: RCOG press. 2010; Chapter 9 - 149-161.
12. Igde FA, Gul R, Igde M, Yalcin M. Abortion in Turkey: women in rural areas and the law. Br J Gen Pract. 2008; 58-550: 370-373.
13. Rasch V, Kipingili R. Unsafe abortion in urban and rural Tanzania: method, provider and consequences. Trop Med Int Health. 2009; 14-9: 1128-1133.
14. Rorbye C, Norgaard M, Nilas L. Medical versus surgical abortion: comparing satisfaction and potential confounders in a partly randomized study. Human Reproduction. 2005; 20-3: 834-838.
15. Agrawal A, Regmi MC, Uprety DK, Pokhrel H, Rijal P. Feasibility and Acceptability of Medical Abortion at BPKIHS. Health Renaissance. 2010; 8-3: 142-146.
16. Lara D, Abuabara K, Grossman D, Diaz-Olavarrieta C. Pharmacy provision of medical abortifacients in a Latin American city. Contraception. 2006; 74-5: 394–399.
17. Fiala C, Gemzell-Danielsson K. Review of medical abortion using mifepristone in combination with a prostaglandin analogue. Contraception. 2006; 74-1: 66–86.
18. Falahian M, Mohammad-Zadeh F. Trends in abortion in Iran: 1994–2002. Archives of Iranian Medicine. 2005; 8-3: 217-218.
19. Briozzo L, Vidiella G, Rodrguez F, Gorgoroso M, Faundes A, Pons JE. A risk reduction strategy to prevent maternal deaths associated with unsafe abortion. Int J Gynaecol Obstet. 2006; 95-2: 221-226.
20. Norris A, Bessett D, Steinberg JR, Kavanaugh ML, De Zordo S, Becker D. Abortion Stigma: A Reconceptualization of Constituents, Causes, and Consequences. Women's Health Issues. 2011; 21 -3 Suppl: S49-S54.

21. Behjati-Ardakani Z, Akhondi MM, Sadeghi MR, Sadri-Ardekani H. The study of various aspects of induced abortion in Iran. Fertility & Infertility Autumn Quarterly. 2005; 299-320. [In Persian].
22. Levandowski BA, Kalilani-Phiri L, Kachale F, Awah P, Kangaude G, Mhango C. Investigating social consequences of unwanted pregnancy and unsafe abortion in Malawi: The role of stigma. Int J Gynaecol Obstet. 2012; 118 - Suppl 2: S167–S171.
23. Culwell KR, Vekemans M, De Silva U, Hurwitz M, Crane BB. Critical gaps in universal access to reproductive health: contraception and prevention of unsafe abortion. Int J Gynaecol Obstet. 2010; 110 Suppl: S13-S16.

THE ROLE OF MEDICAL SCHOOLS IN THE DISTRIBUTION OF PHYSICIANS STRENGTHENING PRIMARY HEALTH CARE

Orvill Adams [1]
http://orcid.org/0000-0002-7759-7584
orvill@orvilladams.com

Bolat Zhanturiyev [2]
http://orcid.org/0000-0002-3230-9016
bolatzhan@kaznmu.kz

[1] Department of Epidemiology and Community Medicine, University of Ottawa, Canada, WHO Collaborating Centre for Knowledge Translation and Health Technology Assessment in Equity, University of Ottawa, Canada
[2] Department of International Health care, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan

ABSTRACT

Primary Health Care (PHC) is a central focus of many health sector reform initiatives. The effectiveness of PHC requires an effective health workforce. This is especially evident in rural parts of countries which have significant difficulties in attracting physicians and nurses. Countries continue to try a range of strategies which require the collaboration of a number of government and non – governmental actors. Among the many actors medical schools have critical role to play in the selection, education and orientation of students for PHC and rural practice.

KEYWORDS: Primary Health Care (PHC) , Health Sector Reform, Education, Medical Schools, Universal Health Coverage, Health Care Workers

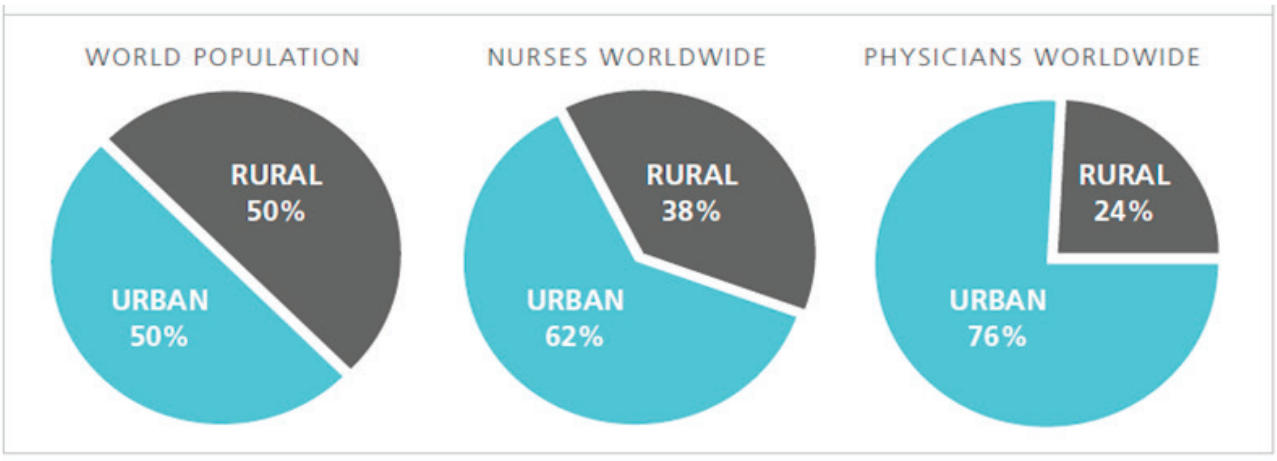
INTORDUCTION

"Human resources for health are the indispensable input to effective implementation of primary care and universal coverage reforms, and they are also the personification of the values that define PHC. Yet, in the absence of a deliberate choice to guide the health workforce policy by the PHC goals, market forces within the health-care system will drive health workers towards greater sub-specialization in tertiary care institutions". (WHO, 2008)

There is a clear movement among countries towards a renewal of primary health care (PHC). Universal health coverage based on PHC is a strategy that is being pursued by many countries as a means of making health systems more responsive to the needs of their populations. The strategies are designed to increase access to health services and to involve communities in their health care. Within countries different populations have different level of access to health services. A critical element is the number and distribution of health workers. Healthcare workers usually prefer urban practice to rural practise especially in less developing countries [1, 2]. This poses a serious challenge to equitable healthcare delivery given that, people in rural communities are often sicker, poorer, less educated and have worse access to care [3].

Evidence base strategies from the literature can be categorise into five categories: Education; Selection; Coercion; Incentives and Support [1]. Education – These are strategies to optimise medical training programs in order to stimulate interest and participation in community-based medicine which includes rural practice. Components focus on educational training like pre-vocational and vocational, fellowships, content of the training curriculum, exposure in clinical rotation and preceptor ship. In an effort to attract students into rural practice, Canada and Australia have implemented additional strategies by having

Figure 1. Distribution of world's population of physicians and nurses in urban and rural setting



Source: World Health Organization 2010.

family medicine residents give talks to high school students [4]. Selection strategy focuses on selecting students into health professional training programs with the following components, geographic origin, gender, ethnicity, career intent and service orientation .Service orientation includes volunteer activities that are done prior to medical school in rural areas [5]. Most countries have implemented incentives strategies; which include financial and non – financial reward. Some examples of incentives that have been implemented include; bursaries and scholarships, financial compensation, additional allowance for remoteness and loans and pensions [6, 7]. In an effort to retain health workers, non – financial incentives have ranged from creating cadre positions, opportunities for professional development, and continuing training [8]. Support strategies have included a focus on various ways of supporting health professionals while practicing in rural areas. The components includes, continuous professional development, specialist outreach, time-off, and family and life style issues.

Coercion is the use of authoritarian method to force health professionals into rural practice. This approach has been used by medical councils, professional bodies and governments. Components include registration requirements (use community service as a requirement to register as a medical doctor) pre-requisite for specialization (experience of rural service prior to specialization) and international recruitment that is, limitation of foreign health professionals' recruitment to rural practice. Coercion strategies have been implemented in most countries.

In addition to the factors that attract physicians. The five stage of a physician life is recommended as a component in the process of attracting, recruiting and retention. Life before medical school, experience during medical school, experience during post graduate schools and recruitment and retention after completion of post graduate fellowship qualifications and maintenance action plan to keep professionals satisfied and retain them [9, 10].The diagram below (fig 1) provides an overview of the world's population distribution of nurses and physicians within rural and urban settings.

The strategies discussed above are designed to improve the balance of nurses and physicians in rural and urban areas. The success of the strategies is affected by the context and by supporting policies. The literature suggests that some strategies are more effective than others. Table 1 presents a summary of the evidence. created a centre funded by a 30 million dollar gift dedicated to research in health systems and primary care delivery [11].

Medical schools who are trying to increase the number of graduates entering primary care have used number strategies. A key focus is on the curriculum which has a focus on primary care. For a primary care focussed curriculum to be effective it must be endorsed by the faculty members [12]. A recent article in New England Journal of Medicine [13] cites the following five approaches:

1. "The curriculum should be built around the competencies expected of a primary care physician;

Table 1. adapted from Wilson et.al, (2010)

Interventions	Summary of evidence	Ranking
Selection Geographic Origin	Students from rural origin are more likely to practice in rural settings	strong
Gender	Men are more likely to practice rural medicine than women	strong
Career intent	Study entry interest is to practice rural medicine	strong
Ethnicity and service orientation	Students from underserved, populations & Involvement in volunteer services in rural areas	weak
Training Prevocational curriculum content	Emphasis theoretical importance of rural health issues	Absent (no evidence)
Rural exposure	Clinical rotation in rural settings	moderate
Location		
Post vocational and fellowships		strong

Interventions	Summary of evidence	Ranking
Coercion Registration requirement	Qualified doctors spent community service in rural area	weak
Pre requisite for specialization	Mandatory basic requirements of serving in rural areas before specialization	weak
International recruitment	Recruiting with constrains limitation to rural practice	moderate
Incentives Bursaries	Scholarship with enforcement rural service agreement	moderate
Financial compensation	Provision of direct financial incentives to encourage rural	moderate
Support ;continuous professional development	Provide enough opportunities for professional development motivates rural practise	weak
Specialist outreach support	Providing relevant outreach specialist support	weak
Family lifestyle issues	Addressing most relevant family life style attracts retention	weak

2. Teaching medical students to be part of an inter – professional team should be part of the curriculum;

3. Students should be offered the opportunity to do their clinical training in community – based settings;

4. Socio – medical research , which examines the translation of scientific knowledge into clinical practice (e.g. patients adherence to medications, smoking cessation)

5. Medical schools should develop a culture which supports primary care".

Canadian medical schools have used some additional strategies such as selective admission by screening for students from rural settings and financial incentives and return of service agreements. In the United States, the Physician Shortage Area Program (PSAP) at Jefferson Medical College in Pennsylvania. In the PSAP students are admitted based on having grown up in a rural area. The student has a higher probability of being admitted into the program if they had previously indicated their intention of practicing in a rural area after graduation. The primary care students are supported by advisors in family medicine. The students must also take their family medicine rotation in rural locations [14].

CONCLUSION

There is evidence that medical schools can play a significant part in addressing access to primary care by attracting, training and supporting their medical students to become effective primary care practitioners. The curriculum can be used to influence students to choose rural medicine by ensuring that they have opportunities for exposure to rural community practice and that the learning experiences are positive. The medical schools must work to foster a positive attitude towards family and rural medicine.

REFERENCES

1. Wilson NW., Couper ID., De Vries E, Reid S., Fish T, Marais BJ. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. Rural Remote Health. 2009; 9-2: 1060.

2. Buchan J, Couper ID, Tangcharoensathien V, Thepannya K, Jaskiewicz W, Perfilieva G, Dolea C. Early implementation of WHO recommendations for the retention of health workers in remote and rural areas. Bull World Health Organ. 2013; 91-11: 834-840.

3. Rourke J. WHO Recommendations to improve retention of rural and remote health workers - important for all countries. Rural Remote Health. 2010; 10-4: 1654.

4. Ebuehi OM., Campbell PC. Attraction and retention of qualified health workers to rural areas in Nigeria: a case study of four LGAs in Ogun State, Nigeria. Rural Remote Health. 2011; 11-1: 1515.

5. Pena S, Ramirez J, Becerra C, Carabantes J, Arteaga O. The Chilean Rural Practitioner Programme: a multidimensional strategy to attract and retain doctors in rural areas. Bull World Health Organ. 2010; 88-5: 371-378.

6. Gow J, George G, Mwamba S, Ingombe L, Mutinta G. An evaluation of the effectiveness of the Zambian Health Worker Retention Scheme (ZHWRS) for rural areas. Afr Health Sci. 2013; 13-3: 800-807.

7. Buykx P, Humphreys J, Wakerman J, Pashen D. Systematic review of effective retention incentives for health workers in rural and remote areas: towards evidence-based policy. Aust J Rural Health. 2010; 18-3: 102-109.

8. Viscomi M, Larkins S, Gupta TS. Recruitment and retention of general practitioners in rural Canada and Australia: a review of the literature. Can J Rural Med. 2013; 18-1, 13-23.

9. Rabinowitz HK., Diamond JJ., Hojat M., Hazelwood CE. Demographic, educational and economic factors related to recruitment and retention of physicians in rural Pennsylvania. J Rural Health. 1999; 15-2: 212-218.

10. Dolea C, Stormont L, Braichet JM. Evaluated strategies to increase attraction and retention of health workers in remote and rural areas. Bull World Health Organ. 2010; 88-5: 379-385.
11. Landau M. Medical Schools Invest in Primary Care – Pediatricians and family practitioners, long out of fashion are now in vogue. U.S News Education. 2011. Available from http://www.usnews.com/education/best-graduate-schools/articles/2011/03/22/medical-schools-invest-in-primary-care [accessed on May 25, 2015].
12. Colwill JM. Where have all the primary care applicants gone? N Eng J Med. 1992; 326-6: 387-393.
10. Smith RS. A recipe for medical schools to produce primary care physicians. N Eng J Med. 2011; 346-6: 496-497.
13. Smith RS. A recipe for medical schools to produce primary care physicians. New England Journal of Medicine. 2011; 34: 6.
14. Kapadia R, Mc Grath B. Medical school strategies to increase recruitment of rural oriented physician: the Canadian Experience. Can J Rural Med. 2011; 16-1: 13-19.

STANDARDS OF PENAL REFORM IN THE REPUBLIC OF KAZAKHSTAN

Dauren Dochshanov [1]
http://orcid.org/0000-0002-6256-0287
E-mail: d.dochshanov@kaznmu.kz

Kravchenko Anastassia [2]
http://orcid.org/0000-0002-5423-9768
E-mail: nastick.sheina@gmail.com

[1] Assistant of the Department of communication skills, basics of psychotherapy, general and medical psychology, Asfendiyarov KazNMU, Almaty, Kazakhstan
[2] Assistant of the Department of communication skills, basics of psychotherapy, general and medical psychology, KazNMU, Almaty, Kazakhstan

ABSTRACT

The prison health service in Kazakhstan is currently under the administration of the Ministry of Interior in the Prison Service. As of 2012, there were 18 pre-trial detention facilities and 76 correctional facilities within the structure of the Prison Service. The prison estate's network of treatment and preventative facilities includes three somatic hospitals, one psychiatric hospital and seven specialist TB hospitals, as well as 78 medical units and 16 primary health facilities. In total, there are 3,798 bed spaces. The transfer of prison health services from the jurisdiction of the Ministry of Interior to the Ministry of Health is an important step in the development of Kazakhstani society and a thorough analysis is therefore required.

KEYWORDS: prisoners, medical services, mental health, drug users, vulnerable, communicable diseases.

INTRODUCTION

Internationally, there are currently many different systems for administering prison health services. In many European countries, prison health services are still organised traditionally and fall either under the jurisdiction of the Ministry of Justice or the Ministry of Interior. This is the case in Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, Germany, Greece, Ireland, Latvia, Holland, Poland, Portugal, Spain, and Switzerland. In Hungary, Italy, Luxembourg and Slovenia, there is a mixed system, where responsibility is also shared between the Ministry of Justice and the Ministry of Health. In France, Iceland, Norway, Cyprus, England and Wales medical aid in prisons is provided solely by the Ministry of Health.

ETHICAL STANDARDS

The key concept in the ethical evaluation of this reform is the principle of equivalence of care [1], i.e. that the level of health care provided in prisons should be the same as that which is guaranteed for the rest of society. One of the first documents to define the principle of equivalence in prison health services was the Oath of Athens (1979) [2], which states: 'We, the healthcare professionals who are working in prison settings, meeting in Athens on September 10, 1979, hereby pledge, in accordance with the Oath of Hippocrates, that we shall endeavour to provide the best possible health care for those who are incarcerated in prisons for whatever reasons, without prejudice and within our respective professional ethics.' The principle of equivalence is also established in the UN Principles of Medical Ethics 37/194 [3] (Principle 1): 'Health personnel, particularly physicians, charged with the medical ca¬re of prisoners and detainees, have a duty to provide them with protection of their physical and mental health and treatment of disease of the same quality and stan¬dard as is afforded to those who are not imprisoned or detained'. An indication of the importance of the principle of equivalence is its inclusion in the European Committee for the Pre¬vention of Torture and Inhuman or De¬grading Treatment or Punishment in the Seven basic principles of prison health care organisation [4], which has been agreed by 57 countries. Integrating prison health services with the general health administration is seen as an important step towards realising this principle [5].

LEGAL STANDARDS

Cooperation between penitentiary and mainstream healthcare is actively supported by international committees. Although neither the UN Principles nor the World Health Organization declarations have a directly legal character, they are of great significance in terms of revising national legislation. According to the UN Standard Minimum Rules for Treatment of Prisoners (1955) [6], '[prison] medical services should be orga¬nised in close relationship to the general health administration of the community or nation.' (Rule 22/1). Cooperation between both systems is also recommended by the Moscow Declaration on Prison Health as a Part of Public Health (World Health Organization Regional Office for Europe, 2003) [7]: 'Member States are recommended to develop close working links between the health ministry and the ministry responsible for the penitentiary system to ensure high standards of treatment for detainees, protection for personnel, joint training of professionals in modern standards of disease control, high levels of professionalism among penitentiary health care personnel, continuity of treatment between

the penitentiary and outside society and unification of statistics.' Another important document regulating healthcare for prisoners is the European Prison Rules [8] (Recommendation R (98)7), adopted on 11 January 2006 by the Committee of Ministers of the Council of Europe, 2006. The need for cooperation between the penitentiary and mainstream healthcare system is expressed in § 40.1: 'Medical services in prison shall be organised in close relation with the general health administration of the community or nation', and also in § 40.2: 'Health policy in prisons shall be integrated into, and compatible with, national health policy.'

MEDICAL STANDARDS

The poor state of health of prisoners and the problem of organising effective medical aid for them is an important reason for organising the prison health service within the structure of the Ministry of Health. One of the first systematic inquiries [9] into the prison health service in Great Britain showed that 'any separate system for a minority group tends to sink to a poor standard; being employed by the Home Office makes it more difficult for a doctor when there are conflicts between society's and the prisoner's interests; the Official Secrets Act can hamper clinical independence; and prison is such a total institution that to be in one all the time powerfully influences the doctor's views and behaviour.' The main arguments for cooperation between prison and mainstream health services are set out in the Moscow Declaration [7]: 'Penitentiary populations contain an overrepresentation of members of the most marginalised groups in society, people with poor health and chronic untreated conditions, drug users, vulnerable people and those who engage in risky activities such as injecting drugs and commercial sex work. The movement of people already infected with or at high risk of disease to penitentiary institutions and back into civil society without effective treatment and follow-up gives rise to the risk of the spread of communicable diseases both within and beyond the penitentiary system. Prevention and treatment responses must be based on scientific evidence and on sound public health principles, with the involvement of the private sector, nongovernmental organisations and the affected population.' The experience of countries who have integrated the penitentiary health service into mainstream healthcare shows that the reform had a positive effect on indicators such as greater coverage of hepatitis B vaccination and higher birth weight of babies born to imprisoned mothers, and the time that prisoners waited before they received mental health treatment or dental treatment, for example [10].

CONCLUSIONS

1. International ethical, legal and medical standards attest to the necessity of close cooperation between prison and mainstream healthcare. Transferring the prison health service to the jurisdiction of the Ministry of Health will allow for the further democratisation of Kazakhstani society and bring Kazakhstan significantly closer in line with countries in the European Union [11].
2. Evaluation of the regulation the prison healthcare in Kazakhstan has revealed a lack of coordinated management and administration. The creation of a concerted mechanism for directing the prison health service is a task of utmost priority in implementing the reform [12, 13].
3. Transferring the prison health service to the Ministry of Health may cause inconsistencies in the financing of providers of penitentiary medical services, depending on regional healthcare resources. The creation of the system of financing medicine in prison, which is consistent across all regions, must therefore be introduced as part of the reform process [14, 15].
4. The current Guaranteed Volume of Free Health Service policy is inadequate for correctional facilities, as it does not take into account many forms of medical and surgical treatment. An important task for this reform is to increase access for prisoners to additional health services which they are currently denied [16].
5. The level of professional training of doctors in correctional facilities is lower than doctors in health services outside of prisons. Labour resources should therefore be allocated by state order. It is essential that a mechanism of material incentives for medical experts within penal facilities be created.

A significant problem with the prison health service is the fight against mental disorders, addictions, TB and HIV/AIDS. In Kazakhstan, monitoring and evaluation in these areas, as well as the revision and introduction of standards for medical practice are needed.

REFERENCES

1. Rick Lines. From equivalence of standards to equivalence of objectives: The entitlement of prisoners to health care standards higher than those outside prisons. Int J Prison Health. 2006; 2-4: 269–280.
2. Ethical codes and declarations relevant to the health professions. Available from http://www.amnesty.org [accessed on August 29, 2015]
3. Principles of medical ethics. A/RES/37/194. Available from http://www.un.org/documents/ga/res/37/a37r194.html [accessed on August 29, 2015]
4. CPT: 3rd General Report. Available from http://www.cpt.coe.

int/en/annual/rep-03.html [accessed on August 29, 2015]
5. Charles A, Draper H. 'Equivalence of care' in prison medicine: is equivalence of process the right measure of equity? J Med Ethics. 2012; 38-4: 215-218.
6. "Standard Minimum Rules for the Treatment of Prisoners" Adopted by the First United Nations Congress on the Prevention of Crime and the Treatment of Offenders, held at Geneva in 30 August 1955, and approved by the Economic and Social Council by its resolutions 663 C (XXIV) of 31 July 1957 and 2076 (LXII) of 13 May 1977", August 30, 1955.
7. Moscow Declaration on Prison Health as Part of Public Health. WHO Regional Office for Europe, 2003.
8. Council of Europe. Recommendation of the Committee of Ministers to member states on the European Prison Rules. Adopted by the Committee of Ministers on 11 January 2006 at the 952nd meeting of the Ministers' Deputies.
9. "The college's evidence to the prison services inquiry", Bulletin of the Royal College of Psychiatrists (Mai 1979): 81–84.
10. Prison Health and Public Health: The Integration of Prison Health Services. Report from a conference organized by the Department of Health and the International Centre for Prison Studies London, 2 April 2004.
11. Conception for Improving Criminal Executive Policy in the Republic of Kazakhstan for 2007 – 2015 (ratified 25 September 2006).
12. On Health of Nation and Health Care System. Code of the Republic of Kazakhstan (reviewed 10 July 2012)
13. Kulzhanov M, Karanikolos M, Rechel B. Kazakhstan health system review. Health Syst Transit. 2007; 9-7: 55.
14. Strategic Plan of the Ministry of Health of the Republic of Kazakhstan for 20112015, ratified by Resolution 183 of the Government of the Republic of Kazakhstan (dated 25 February 2011).
15. A Healthy Lifestyle. Program for 2008-2016 ratified by Resolution 1260 of the Government of the Republic of Kazakhstan (dated 21 December 2007).
16. „Salamatty Kazakhstan" for 2011-2015. Order of the President of the Republic of Kazakhstan on Approval of the Government Program for the Development of Healthcare in the Republic of Kazakhstan.

THE DEVELOPMENT OF INTERNATIONAL ACTIVITIES OF ASFENDIYAROV KAZAKH NATIONAL MEDICAL UNIVERSITY IN THE SYSTEM SUPPORT OF EDUCATIONAL PHD-DOCTORAL PROGRAMS

Nurmanbetova Farida N [1]
http://orcid.org/0000-0003-4233-7982
E-mail: faridan_09@yahoo.com

Boshkayeva Assyl K [2]
http://orcid.org/0000-0003-4653-1803
E-mail: kenes65@mail.ru

Orazayeva Flura G [3]
http://orcid.org/0000-0002-3392-7393
E-mail: f.orazayeva@mail.ru

[1] Professor, Vice-rector for continuing education and therapeutic questions of Asfendiyarov Kazakh National Medical University
[2] Doctor of pharmaceutical science, Head of postgraduate education (PhD-doctoral studies and magistracy) of Asfendiyarov Kazakh National Medical University
[3] Chief specialist of postgraduate education (PhD-doctoral studies and magistracy) of Asfendiyarov Kazakh National Medical University

ABSTRACT

Definition of standards for PhD-doctor degree is a means to achieve the desired goal - opportunity to present the future candidates of science education, which has international recognition. The proposed standards are based on the agreed documents produced by the Association of ORPHEUS in Zagreb since 2004, and on the global standards of the Association of Medical Schools in Europe (AMSE) and the World Federation for Medical Education (WFME).

As an institutional member of ORPHEUS, Asfendiyarov Kazakh National Medical University, carrying out the development of international standards in the educational system, has a huge responsibility for the implementation of training programs for PhD-doctors.

KEYWORDS: International Standards, ORPHEUS, AMSE, WFME, PhD of Medical Sciences.

INTRODUCTION

According to acting legislative and normative legal acts and also with basic provisions and tasks of the state program documents in the sphere of higher postgraduate education are defined the following main priorities of development of a national education system of Republic of Kazakhstan: participation of the Kazakhstan higher educational institutions in World ratings of universities and entry into number of top 700 universities; creation of reliable national system of accreditation and passing of independent national institutional and specialized (program) accreditation according to the international standards; flexibility and a susceptibility of educational programs taking into account requirement of labor market; effective and successful functioning of the Kazakhstan higher educational institutions according to key parameters of Bologna Process; realization of two-degree education with foreign universities; preparation highly skilled scientific and research and educational personnel; experience introduction of Nazarbayev University in the operating higher educational institutions of the country; placement of the state educational order according to requirements of the forced industrial and innovative development (in all 12 branches), including providing the pharmaceutical and medical industry with qualified specialists of the enterprises, and also professional development of the experts supervising development of this branch.

Asfendiyarov Kazakh National Medical University (KazNMU) sets before itself the purpose — development of the international activity in system of the higher medical education of the Republic of Kazakhstan, integration into world educational and scientific space through transition from the National level to the International level.

The international cooperation is an integral part of activity of University and the important tool in ensuring quality of education and its compliance to the international standards in training of the competitive experts demanded in labor market of the Republic of Kazakhstan and abroad.

METHODS

Integration into the international space of the higher education and researches through the international partnership / cooperation of Asfendiyarov Kazakh National Medical University is considered in the following positions:

* development of the international cooperation in the ORPHEUS network in development «Integration into the international space of the higher education and researches through the international partnership / cooperation» and to ensuring quality of the PhD programs of doctoral studies and active participation of the faculty of KazNMU in actions of ORPHEUS in 2014-2015;

* training of heads of PhD-doctoral program of KazNMU in cooperation with ORPHEUS abroad and exchange of experience with heads of the PhD programs of the leading foreign universities;

* definition of areas of scientific interests and research projects and coordination of co-directors of PhD of doctoral candidates of KazNMU from the leading foreign universities;

* development of long-term strategy of improvement of quality of the PhD programs and international recognition of ORPHEUS PhD of programs of KazNMU.

Result of joint cooperation of KazNMU with ORPHEUS is the organization of a work-shop, devoted «To the organization of the PhD-doctoral studies programs in biomedicine and sciences about health». The work-shop is organized by School of pedagogical skill of H.S. Nasybullina of Asfendiyarov Kazakh National Medical University on April 14-15, 2014 with ORPHEUS * (viziting-professor's Workshop Zdravko Lakovich). The following results of a work-shop will be planned:

- an assessment of the PhD-doctoral studies programs in medicine developed in KazNMU and their reduction in compliance with recommendations of ORPHEUS;
- introduction of the best international practice to PhD education in KazNMU;
- preparation of PhD-programs in medicine and health care for specialized accreditation;
- introduction in the plan of work of School of pedagogical skill of H.S. Nasybullina of the program of training for training of heads of PhD-programs;
- the introduction of KazNMU as the institutional partner in ORPHEUS;
- planning of participation of KazNMU in actions of ORPHEUS.

RESULTS

On the basis of comprehensive study and the analysis of the international experience of the best practice in activity of universities, the International standards of the World Federation of Medical Education (WFME) on improvement of quality of medical education, Association of Medical Schools of Europe, and also the carried-out reform in the sphere of the higher and postgraduate education by the Ministry of Education and Science of the Republic of Kazakhstan was developed the concept «KazNMU – university of the international level». The concept will be agreed with objectives in the Message of the President of the Republic of Kazakhstan - the Leader Nation of N.A. Nazarbayev Narodu Kazakhstana «The Kazakhstan way – 2050: The uniform purpose, uniform interests, the uniform future» of 17.01.2014.

At a stage of implementation of the concept in the field of education is provided the continuity of education levels according to the competence-based focused Model of medical education of KazNMU; quality of the academic mobility of students, teachers, researchers and employees is provided (tools of the academic mobility are developed, monitoring of the academic mobility is introduced); efficiency of the program of involvement of foreign teachers and researchers, their foreign universities in implementation of joint scientific projects, publications in magazines with IMPACT a factor, in transfer of innovative technologies to education and clinical practice is reached.

The concept of development of post-degree medical education and continuous professional development in the Asfendiyarov Kazakh National Medical University for 2014-2017 approved in May 2014, determined by a main objective ensuring quality of the realized programs of post-degree preparation and continuous professional development of experts of health care through compliance to requirements of health care and to the principles of the best clinical practice, harmonization and internationalization, integration into the European space of the higher education and scientific researches, assistance to development of potential of teachers of KazNMU and to introduction of innovative technologies in system of training of specialists and researchers, ensuring their competitiveness.

Educational doctoral studies programs for specialties 6D110100 – «Medicine», 6D110200 - «Public health care», 6D110400 – «Pharmacy», 6D074800 – «Technology of pharmaceutical production» are realized in the Republican state enterprise on the right of economic maintaining «Asfendiyarov Kazakh National Medical University» of Ministry of Health of the Republic of Kazakhstan, having the license for the right of conducting educational activities for these specialties.

In a basis of definition of the purposes and tasks of development of educational programs are put mission, the purposes and the tasks of development of University and a national education system given in Laws of the Republic of Kazakhstan «About education» and «About science» in the program documents «Strategy of Industrial and Innovative Development of RK for 2003-2015», «Strategic Plan of the Ministry of Education and Science of the Republic of Kazakhstan for 2010-2014».

Educational doctoral studies programs of KazNMU are the programs of professional higher postgraduate education having the scientific and pedagogical focus and fundamental, educational, methodological and research preparation and profound studying of disciplines in the respective directions of sciences allowing to receive the highest academic degree on specialties of doctoral studies «the doctor of philosophy (PhD)».

The educational program for all training specialties has the following purposes:

- quality achievement of postgraduate professional education at observance of obligatory requirements to the level of training of doctoral candidates;

- creation of the monitoring system behind overall performance of the organizations of science and education which are carrying out training of doctoral candidates;

- streamlining of the rights and responsibility trained in doctoral studies, stimulation of independent educational, research and professional activity of doctoral candidates;

- ensuring recognition of documents of the Republic of Kazakhstan on award of the academic degree «the doctor of philosophy» (PhD) in the international educational space and labor market.

The standard duration of development of an educational program of doctoral studies - 3 years. The realization of educational doctoral studies programs is enabled by university in close cooperation with the leading foreign organizations of science and education. Presence of two scientific consultants (domestic and foreign) allows to provide to the doctoral candidate fundamental preparation in the chosen area, and also possibility of use in the scientific researches the latest development in the field of science. Research a component of an individual trajectory of training of the doctoral candidate assumes possibility of foreign training at university of the foreign head that ensures functioning with primary sources, possibility of carrying out scientific experiments on the basis of the accepting higher education institution or the research center, performance on scientific symposiums, conferences, work-shops of the international level, etc. Educational and methodical and information support of educational process guarantees possibility of high-quality development by doctoral candidates of an educational program of doctoral studies. Realization of an educational program is provided with a free access to the international information networks, electronic databases, to library stocks, computer technologies, educational and methodical and scientific literature.

DISCUSSION AND CONCLUSION

In development of educational programs of medical education on the basis of the principles of the Bologna declaration, the ENQA standards (Standards and recommendations for a quality assurance of the higher education in the European space), State obligatory standard of education RK (SOSE RK), NSAQE RK (National system of an assessment of quality of education of RK): by order of the rector No. 342 of 13.04.12 «The virtual institute of Bologna Process» which conducts work on the academic mobility of Ph-doctoral candidates, the academic mobility of the faculty, recalculation of the credits of ECTS, viziting-professors is created. In 2012 is created the Center of distance learning within virtual institute of Bologna Process which in 2014 was transformed to Educational department on distance learning.

Competitiveness of doctoral candidates is provided with quality education, the thought-over system of the organization of practical preparation (The center of practical skills, the Center of communicative skills, exit practice of doctoral candidates, 92 clinical bases, the Joint university clinic), a dual format of development of educational programs therefore in Mission it is defined «… social and responsible university, being the leader in Central Asia in multilevel training of competitive experts of health care and pharmacy».

REFERENCES

1. Nerad M, Heggelund M. Toward a Global PhD? Forces and Forms in Doctoral Education Worldwide. Seattle: University of Washington Press. 2008.
2. «Doctoral Programmes for the European Knowledge Society» Bologna Seminar, Salzburg, 3-5 February 2005. Available from: www.eua.be [Accessed on Apr 25 2015].
3. The Bologna Declaration of 19 June 1999. Joint declaration of the European Ministers of Education. Available from http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf [Accessed on May 4 2015].
4. Zagreb declaration and ORPHEUS consensus documents 2004-2011. Available from www.orpheus-med.org [Accessed on Apr 16 2015].
5. ORPHEUS 2009 position paper. Towards Standards for PhD Education in Biomedicine and Health Sciences. 2009. Available from www.orpheus2009.org, www.orpheus-med.org [Accessed on Apr 11 2015].
6. WFME Global Standards for Quality Improvement in Medical Education. European Specifications For Basic and Postgraduate Medical Education and Continuing Professional Development. WFME/AMSE International Task Force, WFME Office Copenhagen. See WFME and AMSE. Available from: www.wfme.org [Accessed on May 18 2015] and www.amse-med.eu [Accessed on May 18 2015].
7. Salzburg II Recommendations: European universities' achievements since 2005 in implementing the Salzburg Principles. European Universities Association – Council for Doctoral Education. 2010. Available from www.eua.be/cde [Accessed on May 18 2015].
8. Gordon D, Lindgren SC. The global role of the doctor in health care. The World Medical & Health Policy. 2010; 2-1: 19-29.
9. Gordon D, Christensen L, Karle H. Medical Education in the Bologna Process. A Critical Appraisal of Current Practice and Implementation. European University Association Bologna Handbook, Brussels. 2009; C5: C5.1-5: 1–22.
10. Karle H. Current standards for the best possible postgraduate training of specialists – do we need reform? Conference book. Union Européenne des Médecins Spécialistes (UEMS). 50th Anniversary Conference. Brussels, Belgium. April 2008.
11. International Recognition of Basic Medical Education Programmes: A WFME Position Paper. The Executive Council, the World Federation for Medical Education Medical Education. 2008; 42: 12-17.
12. Karle H, Gordon D. Quality standards in medical education.

Lancet. 2007; 370-9602: 1828.
13. Karle H. Relevance of the WFME Global Standards in Medical Education in the South East Asian Region. South East Asian J Med Education. 2007; 1: 2-7.
14. Christensen L. Survey of Quality Assurance and Accreditation of Basic Medical Education in Europe. Quality Assurance Task Force MEDINE Thematic Network. Report, WFME Office, October 2007.
15. The Thematic Network on Medical Education in Europe. WFME Global Standards for Quality Improvement in Medical Education. Quality Assurance Task Force of MEDINE. European Specifications. Copenhagen, 2007.
16. Karle H. Quality Accreditation – Ethical Aspects. Conference Book, AMEA 2007 Conference.
17. Karle H, Mercer H. Quality Assurance of Health Education. Addressing the Need through New Directories. Internat Pharmaceutic J. 2007; 22: 40-42.
18. Field M, Geffen L, Walters T. Current Perspectives on Medical Education in China. Med. Educ. 2006; 40-10: 938-939.
19. Karle H. Global Standards and Accreditation in Medical Education: A View from the WFME. Acad Med., 2006; 81-12 Suppl.: 43-48.
20. Lindgren S., Gordon D. AM last page. The World Federation for Medical Education (WFME). Acad Med. 2012; 87-6: 831.

INNOVATIVE SCIENTIFIC SCHOOL OF GERONTOLOGY OF ASFENDIYAROV KAZAKH NATIONAL MEDICAL UNIVERSITY

Yeshmanova Ainur [1]
http://orcid.org/0000-0002-8358-5045
E-mail: ayeshmanova@yandex.kz

Chaikovska Vira [2]
http://orcid.org/0000-0002-7869-3340
E-mail: chaykovska53@mail.ru

Umutbayeva Gulmira [3]
orcid.org/0000-0002-0624-7712
E-mail: umutbayeva.gb@gmail.com

Abikulova Akmaral [4]
http://orcid.org/0000-0003-0593-063X
E-mail: abikulova@mail.ru

Akanova Assiya [5]
http://orcid.org/0000-0002-3929-5411
E-mail: a.a.akanova@gmail.com

Beltenova Aizhan [6]
http://orcid.org/0000-0002-0690-839X
E-mail: beltenova.aizhan@mail.ru

[1] Head of Department "Gerontology and Geriatrics" Asfendiyarov Kazakh National Medical University, Head of Innovative Scientific School of Gerontology, Almaty, Kazakhstan, MD, PhD
[2] D.F. Chebotarev State Institute of Gerontology NAMS of Ukraine, Kiev, Ukraine, MD, DMS, Professor
[3] Department "Gerontology and Geriatrics" Asfendiyarov Kazakh National Medical University, Innovative Scientific School of Gerontology, Almaty, Kazakhstan, MD
[4] Department "Gerontology and Geriatrics" Asfendiyarov Kazakh National Medical University, Innovative Scientific School of Gerontology, Almaty, Kazakhstan, MD, PhD
[5] Research officer of the "Neuroscience" Virtual Institute, PhD student, neurology internship and residency department of the Asfendiyarov Kazakh National Medical University

ABSTRACT

The aim of this article to show the first results of the Innovative Scientific School of Gerontology of Asfendiyarov Kazakh National Medical University (KazNMU) is the implementation of the principle of integration of «education-science-practices» in the field of gerontology.

METHODS

Events in the framework of the Innovative Scientific School of Gerontology divided into 3 blocks: «Research Environment», «Gerontology science», «Gerontologist-Researcher», covering several positions, which will be carried out over several years.

RESULTS

For 2 years work of the Innovative Scientific School of Gerontology has achieved some success in education, science and practice.

CONCLUSION

The Innovative Scientific School of Gerontology of KazNMU showed active work which based on the principle of integration of science, education and practice.

KEYWORDS: Gerontology, Geriatrics, Education, Science, Practice

INTRODUCTION

The Republic of Kazakhstan refers to one of the Emerging markets and one of the key Nation States in Eurasia. It helps to meet the challenges of the population ageing providing for the development of human resource and poverty decrease [1]. Demographic challenges of the third millennium are indicative for socio-economic developments of the Republic of Kazakhstan pursuing its entering the block of leading countries of the world.

Changes occurring in the modern demographic situation in the Republic of Kazakhstan are related first of all to the pronounced processes of population ageing [2]. At present the share of population aged 65 and older exceeded 7 %, thus including it into the list of "ageing" countries. The proportion of population at the age of 60 and over reached 11,2% by the by the beginning of 2015 with a tendency of increasing up to 25% by the middle of the century. At the same time the share of population aged 80 and older will triple. Projected average life expectancy in the coming decade will grow from 70,3 to 72,0 years. Thus by 2020 expected increase of these indices for men and women will reach 65,76 and 75,02 years correspondingly, which is still below those in the countries of the Western Union by 8-12 year [3, 4].

At that, probability of survival till the age of 60 years is predicted for 65,8% of men and 84,8% of women, while till the age of 75 years - for 30,3% and 57,8%, correspondingly.

The Republic of Kazakhstan is armed with a powerful research potential. During 22 years of its independence the Republic of Kazakhstan turned to be one the most significant states in Eurasia, whose opinion is greatly valued. During this period the country reached significant success in the development of national culture, research and policy [4].

Thus, the Republic of Kazakhstan enjoys early stage of

demographic ageing and an increase in the share of the older population [5, 6]. The issues of ageing require a complex approach that is why they occupy important place being integrated into the governmental policies. The State Programme of Health Development in the Republic of Kazakhstan for 2011-2015 includes tasks specific for elaboration of gerontological area, i.e. development and improvement of evidence-based protocols for diagnosis, treatment and rehabilitation of old and senile patients; development and introduction of educational programme in geriatrics and palliative aid for doctors, paramedical personnel and social workers; development and implementation of the system of estimation (indices) of effectiveness of gerontological and geriatric care, framing of a new system of geriatric assistance run by the state [7, 8].

One of the major prerequisites for the development of gerontology as a scientific discipline and applied specialty is education and training of highly qualified human resource, since increased share of older population in the country requires increased volume and level of medical and social service. Therefore, KazNMU opened the module "Gerontology and Geriatrics" in 2013 to teach students of the 5th year of the faculty "General medicine" and postgraduates to improve qualification of physicians and nurses within the research and technical program of the Health Ministry of the are Republic of Kazakhstan "Development of the model of anti-ageing and active longevity of seniors in Kazakhstan". Start-up and development of the gerontology and geriatrics module is based on the transfer of advanced technologies in gerontology. As a result of this module activity and that of research team of the KazNMU there has been created a special web-site http://www.100let.kz, there has been issued a text book "Gerontology and Geriatrics" for geriatricians, social workers, students of high schools, there has been issued a special guide book for pensioners of the Republic of Kazakhstan and their families edited by the principal of the University, Honoured scientist of the Republic of Kazakhstan, Professor A. Akanov and Professor K. Tulebayev. In this guidebook, a pensioner can find all necessary information in regard to his/her social status: legislative and medical information, reference data about the pension security agencies, advices of healthy life, available training and educational programs, etc. Special web-site http://www.100let.kz provides detailed information useful for elderly people and their families, as well as practical resource for medical and social workers occupied in the system of geriatric service of the Republic of Kazakhstan.

In 2015, Eurasian Research Institute of Gerontological Problems was established on the basis of the Medical Centre of President's Affairs Administration of the Republic of Kazakhstan for coordination and development of research in the field of gerontology. Demographic ageing by itself leads to the increase in the number of people who need permanent medical and social assistance. Therefore one of the country's strategic targets consists in creation of steady research as well as applied and educational resources necessary to meet the challenge [9].

OBJECTIVE

In this context, in 2014 there was formed the Innovative Scientific School of Gerontology (ISSG) of the KazNMU. A. Yeshmanova, PhD is a research supervisor of the section and Professor V. Chaikovska is a research consultant of the section. Strategic directions of the Innovative Research School in Gerontology comprise formation of solid scientific basis and consolidation of ties with other organizations in the field of gerontology which will ensure comprehensive interaction of professionals from various spheres. This will contribute to the development of new gerontotechnologies, elaboration of prognosticative investigations aimed at identification of most prospective studies in gerontology, formulation of methodology for the development of geriatric structures and geriatric service, interaction of governmental and non-governmental structures; building up and increase of research and manpower potential in the field of gerontology; distribution of knowledge about the Madrid International Plan of Action on Ageing and contemporary viewpoint on the analysis of situation and "road map", compiling information basis for a wide system of medical and social aid to seniors and their families, promotion of volunteering among students and retirees, establishment of the Third age university for the elderly with the help of medical students [10, 11, 12].

METHODS

Events in the framework of ISSG divided into 3 blocks: «Research Environment», «Gerontology science», «Gerontologist-Researcher», covering several positions, which will be carried out over several years and will focus on:

- The creation of a permanent, stable research environment and improvement through the development of effective links with other organizations in the field of gerontology with experts of different specialties, which will join efforts in the development of new technologies in gerontology (block №1 «Gerontology Research Environment»);
- Systemic, prognostic studies to identify promising research directions in gerontology, the formation of a methodological basis for the development of geriatric

institutions and geriatric services in general, with the interaction of state and non-state structures (block №2 «Gerontology science»);
- Training and improving the scientific potential of staff for the creation and development of innovative scientific school in the field of gerontology at KazNMU (block №3 «Gerontologist-Researcher»).

RESULTS

For 2 years of ISSG work has achieved some success:
1. Won and implemented 3 university grants.
2. As a co-executor carries 1 grant of the Ministry of education and science of the Republic of Kazakhstan (MES RK) and 1 international grant (with the Institute of Gerontology of the National Academy of Medical Science of Ukraine «Palliative care of elderly people and old age in the family and society» (2012-2014.), And a joint research project «Caring for the sick and elderly invalids at home «(2015-2017).
3. On the basis of scientific school is educating 1 master's degree student.
4. Carrying an active transfer of new technologies into the educational process and the practice confirmed by the Acts of introduction.
5. ISSG accepted into the Society of Gerontology of Kazakhstan - a member of the International Association of Gerontology as a science section. Information about the scientific school of gerontology of KazNMU placed in the International Encyclopedia of the Gerontological Society.
6. ISSG participated in the development of the Regulation data on the geriatric service of Kazakhstan and job descriptions for geriatrics doctors, geriatric nursing service in the working group the Ministry of healthcare and social development of the Republic of Kazakhstan.
7. ISSG has developed a professional standard of «Geriatrics» which commissioned by the Ministry of healthcare and social development of the Republic of Kazakhstan.
8. ISSG offers courses of postgraduate training for doctors and nurses on the theme «Innovative technologies in geriatric practice»
9. Developed system «Student Health Navigator» and introduced to the work of the united university clinic to automate the process of medical examination of students.
10. Developed 4 manuals, 1 copyright certificate.
11. Published 6 articles in journals with impact factor, more than 20 publications in journals recommended by Control Committee in Education and Science, 5 articles of students, more than 20 abstracts.
12. 13 presentations at international conferences, 11 reports of students in the framework of international conferences on the Scientific Research Work of Students
13. Submitted student's research works and presented at the competition, which were awarded by diplomas:
1) I degree diploma at the republican competition of MES RK research works of students (Isamatov B 5 year General Medicine 2014)
2) I degree diploma at the university contest of the Scientific Research Work of Students (Isamatov B 5 year General Medicine 2014)
3) a diploma of I degree at the university contest of Scientific Research Work of Students (Hayrusheva D, 5 year General Medicine, 2015)
4) II degree diploma on the competition of scientific works of students within the framework of an international conference (Hayrusheva D, 5 year General Medicine, 2015)
ISSG actively engages students of «Nazarbayev Intellectual Schools» in scientific work. The result is a 5 scientific works, which are presented in the contest of the Small Academy of Sciences. Conducted a joint study on the prevention of professional burnout of teachers with recommendations.
ISSG constantly improving scientific skills of young scientists. In 2015, organized training in gerontology center Saint Tom Vilenef France, Institute of Gerontology of Ukraine and won two scholarships for scientific training in the International Institute on Ageing, United Nations - Malta.
ISSG is actively working with the National Center for Healthy Life Style, designed «Diary of an elderly patient» and with the «Committee of public health» - tested veterans and staff of the Akimat of Medeu district with the issuance of conclusions and recommendations, conducted a survey of more than 3,000 older people of this district for medical and social assessment, for this work was accepted by the staff of the module "grateful letter" of Akim of Medeu district of Almaty. Each year, the staff of module carries out charitable actions for veterans and elderly patients at clinical sites of the module and the House Veterans.

CONCLUSION

Thus, established in 2014 ISSG of KazNMU showed active work which based on the principle of integration of science, education and practice.

REFERENCES

1. Akanov A.A., Yamashita S., Meyermanov S., et.al. Elderly people and their problems: experience in Japan and Kazakhstan. Nagasaki; Almaty, 2008.
2. Akanov AA, Tulebaev KA, Eshmanova AK, Chaikovskaia VV, Abikulova AK, Kalmakhanov SB, Mansharipova AT. Analysis of condition and prospects in geriatric care of population of Kazakhstan. Adv Geront. 2014; 27-3: 589-595.

3. Senior generation in Kazakhstan: looking into the future, Almaty, 2005, UNFPA. P. 144
4. Ageing in the XXI century: triumph and challenge. Press release Final.rus. 2011; 10-1.
5. Benberin VV. The problems of development of the gerontological service in Kazakhstan. J Research Inst Cardiol and Intern Dis of the Health Ministry the Rep Kazakh. 2013; 93
6. Benberin VV, Akhetov AA, Tanbaeva GZ. Medical social modeling technologies for active aging in Kazakhstan. Adv Gerontol. 2015; 28-1:173-176.
7. State program of health care development in the Republic of Kazakhstan "Salamatty Kazakhstan" for the period of 2011-2015 (adopted by the Law of the President of the Republic of Kazakhstan of November 29, 2010, № 1113)
8. Devi S. Reforming health care in Kazakhstan. Lancet. 2014; 383-9936: 2197-2198
9. Sidorenko AV, Mikhailova ON. Implementation of the Madrid International Plan of Action on Ageing in CIS countries: the first 10 years. Adv geront. 2013; 26-4: 585-593
10. Sidorenko AV. World Policies on Aging and the United Nations. Global Health and Global Aging. M.Robinson et al.Jossey-Bass, San Francisco. 2007: 3-14.
11. World population aging 1950-2050. New-York: United Nations. 2002.
12. Kulzhanov M, Rechel B. Kazakhstan: Health System Review. Health Systems in Transition. 2007; 9-7: 1-158

ACKNOWLEDGEMENTS TO REVIEWERS

ACKNOWLEDGEMENTS TO REVIEWERS OF CENTRAL ASIAN JOURNAL OF MEDICAL SCIENCE AND EDUCATION, VOLUME 1, NO 1, 2015

The Editorial Board of Central Asian Journal of Medical Science and Education want to express their esteem and sincerely thank the following reviewers for their contributions to the Journal and support the worldwide medical students. Thanks for your time and support.

Eya Cherif, Professor Internal Medicine, Geriatrician, Department of internal medicine - Charles Nicolle Hospital, Tunis, Tunisia
Email: eyacherif@yahoo.fr

Adrian Salari, Scientific Researcher, Scientific Laboratory of Gerontology, Chisinau, Moldova
Email: adrian.salari@usmf.md

Mehedi Hasan Khan, Associate Professor, Department of Population Sciences, University of Dhaka
Dhaka-1000, Bangladesh
Email: mehedi_dps@yahoo.com

Kaushal K Tiwari, MD (Hons), MS, IMCS, PhD, Associate Professor of Surgery, Consultant Cardiothoracic and Vascular Surgeon, College of Medical Sciences, Teaching Hospital
Email: drkaushalkt@yahoo.com

Walter V. Hancklosky, PhD, Distinguished Professor Emeritus, University of South Carolina, Columbia, USA
Email: whanclosky@sc.edu

Imtiaz Ahmed, MBBS (DMC), DPS(DU), Senior Executive, Medical Affairs, GSK, Bangladesh Limited
Email: imtiazdmc@gmail.com

Gulnara Kassymova, MD, PhD, Professor, Chief of Department “Sport Medicine”, Asfendiyarov Kazakh National Medical University, Almaty, Kazakhstan
Email: q.kasymovamed@mail.ru

Saule Doskozhayeva, MD, DMS, Member of the Board – Vice-rector for educational and scientific work, Kazakh Medical University of continuing education, Almaty, Kazakhstan
Email: sdoskojaeva@mail.ru

ISSN 2412-3692