

**NATIONAL UNIVERSITY OF
PUBLIC SERVICE**

Lt.Col. Zsolt FEJES MD

**Analysis of upper-respiratory tract diseases in military,
battlefield and certified circumstances**

PhD thesis author's guide and official reviews

Budapest
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1. FORMULATION OF THE SCIENTIFIC PROBLEM

Nowadays UN missions are operating in sixteen crisis zones in the world. Among these there is the UNFICYP United Nations Peacekeeping Forces in Cyprus, which possesses the oldest mandate, made in 1964. Hungary has been a member of this mission since 1993, where one of the most important position, the Force Medical Officer has been occupied by Hungarian military doctors since 2001. Spending several years in this position I had the opportunity to process and analyze health care data made and cumulated in years.

Besides the represented scientific value the gathered and conceptualized knowledge provides information to plan military-health care strategies of future mission engagements.

My chosen and researched topic is interdisciplinary, which contains laryngological, microbiological and public health care references besides its military medical topic. As for the topic, my research is not just about otorhinolaryngology but a comprehensive research of military and operation health care, which contains preventive medicine, diagnostics and clinical medicine.

My results contain otorhinolaryngological innovation but their practical applicability is mainly valued in relation to military health care. Otorhinolaryngology related results of my dissertation indicate the importance of protocol based professional decision-making mechanisms and in connection with military health care, draw the attention to a research database with operation subject-matter and also to the importance of making an operation research infrastructure and to the scientific importance of the data made in operation zones.

My dissertation, according to its title, contains data analysis of a research, which conducted among a pre-chosen population namely, soldiers from different nations serving in appropriate circumstances, in missions abroad. During the research a big international database was analyzed from different aspects. From 15,749 cases registered in UNFICYP between 1st January 2009 and 31st December 2012, 2,521 upper respiratory affections were chosen for statistical analysis. It is followed by about 600 patients' inquiry forms, otorhinolaryngological physical examinations and 200 microbiological sampling of throat swab.

At the beginning of my research, using different health indicators and comparing diagnosis frequency, I assumed and later as the examinations went forward I regarded as a fact that upper respiratory diseases, comparing with other contingents, occurred in the highest rate among Hungarian soldiers. In my research I was looking for answers and relations in order to reveal the cause of this fact.

Soldiers sent to the operation zone in Cyprus are come from Europe (UK, Slovakia, Hungary) and from the American continent (Argentina, Chile, Paraguay, Brazil). According to my assumption, after the arrival in Cyprus numbers of diseases should show big difference mainly among the members of the South-American contingents. The cause I assumed was the big geographical distance, the change in the environmental and climate factors and the different colonization capacity of pathogens reacting to these different socio-cultural factors. However, the available data showed that upper-respiratory diseases occurred in the highest rate among Hungarian solders, comparing different health indicators and diagnosis-frequency. In order to analyze this phenomenon with the appropriate caution and to reveal its causes, I have gathered data and statistic analysis with the participation of four contingents (Argentine, British, Slovakian, Hungarian) for years.

The starting point of the research and its most important establishment is that upper-respiratory diseases occur in higher rate among Hungarian soldiers, than among soldiers from other nations in UNFICYP missions.

Since the typical climate and environmental factors of the mission, diet, water consumption and the possibilities of diagnoses and therapies are standardized, the system of data process and report criteria is also uniform and well-defined, my research had a unified base regarding these data.

I gathered both the retrospective and real-time elements of the necessary data in operation zone. I completed an analysis and evaluation of health documentation and statistic data, physical and microbiological examination of soldiers from four nations in order to clarify the causes of the above mentioned problem.

2. AIMS OF THE RESEARCH

- processing statistic data of upper-respiratory diseases in the mission,
- defining the group of upper-respiratory diseases, which has a highly significance in connection with military and mission,
- creating real image of the exact rate of Hungarian solders' upper respiratory diseases with the analysis of the processed data and the comparison with similar indicators of other nations,
- testifying a hypothesis, which says that upper-respiratory diseases occur in higher rate among Hungarian soldiers,
- revealing the connections between tonsillectomies performed in childhood or adulthood and the prevalence of upper-respiratory diseases during mission,
- verifying a hypothesis, which says accumulation of bacteria or lack of them in the normal pharyngeal flora of soldiers who had tonsillectomies is connected with the higher rates of upper-respiratory diseases,
- making an international comparative analysis of tonsillectomy rates in the member countries of the EU,
- indirect aim is to draw the attention to the scientific values of health data acquired in mission zones through data of this dissertation.

3. SCIENTIFIC METHODS

After the investigation of national and international literature in connection with the topic of the research, general history of military health care, summary of Hungarian military doctors'

research publications, introduction of the UNFICYP as research site, revision of data provided by research literature on physiological, pathophysiological and clinical analysis of pathogens, known factors and environmental effects on creating upper-respiratory diseases were revised and summarized.

Retrospective data collection, then statistic analysis were made on numbers of disease and diagnosis (15 749 cases) in the UNFICYP between 2009 and 2012, giving special attention to the upper-respiratory disease groups (2 521 cases) with common cold and sore throat. The aim of that was to confirm the phrased issues of the research hypotheses with actual and real numbers and to provide the research with anchors with objective base-line. According to data of bases, I was looking for proof of the fact that upper respiratory diseases occur more frequently among Hungarian soldiers, than among soldiers from other nations.

Survey with questionnaire was made with the help of four mission contingents, which aim was to create a database of demographical, antropometrical, health characteristics and socio-cultural habits of people serving in missions for a real-time condition research. The survey analysed the dominance of different disease- and symptom-groups.

Comparative data analysis was made on the number of performed tonsillectomies in member countries of EU, which primary aim was to compare independent numeric data and results of missions and secondary aim was to strengthen the guideline of the research.

Microbiological laboratory examination was made on members of a definite target group, which had important health parameters (came through tonsillectomies) in the view of the research and on its control group. The aim of the examination was to give us a picture of the presence or the lack of pathogens in both groups through comparative numeric data.

4. BRIEF DESCRIPTION OF THE PERFORMED EXAMINATIONS IN EACH CHAPTER

First chapter of my study (1.1) contains a summary of national and international literature in connection with the topic. Introducing literature in connection with UNFICYP (1.2) became necessary because giving a background and introducing the research site were needed.

In the third subchapter of the first chapter (1.3) I revised the regulations and system of health care statistics and analysis. In this part I review such applications, with which accurate organization and scientific process of cumulated data became secured.

In the next step of the research I conducted a revision (1.4) of environmental effects, physiological, pathophysiological, clinical analysis of pathogens, which take place in causing upper-respiratory diseases then I defined (1.5) groups of upper-respiratory diseases relevant to the research and groups of pathogens, which can cause these diseases. Essential part of my dissertation is the general microbiological studies, especially those strains of bacteria, which come on for discussion in connection with hypotheses (1.6).

Second chapter reviews results of secondary-research, which uses information that has already been available during data process of UNFICYP. During the retrospective analysis, data of four years were analysed and processed statistically in which I examined health care data of mission soldiers retroactively in which I prioritized results of upper-respiratory

diseases. In this part of my research, based on statistic data, I was looking for verification of the statement that says there is more upper-respiratory disease among Hungarian soldiers than among soldiers from other nations.

Next phase of the research, which is summarized in chapter 3, I was looking for connections in order to reveal the causes of higher rates of upper-respiratory diseases in Hungarian contingents. I conducted a questionnaire with the help of four contingents, which aim was to create a database of real-time condition analyses. In the next phase of the research I paid great attention to the relative high number of performed operations and therefore, according to the direction of the research, I examined the operations mentioned by patients' anamneses in connection with tonsillectomies and other operations.

During analysis of the questionnaires, demographical, anthropometrical and socio-cultural data analyses were conducted too, with which I was looking for connections between environmental factors, sporting habits and the frequency of respiratory diseases.

In the view of tonsillectomy rates objective data comparison of own research data and international data became necessary, which is placed in chapter 4 of this dissertation. In order to make a comparative analysis I used the HEIDI-ECHI application of EU, in which I was looking for parallel data of performed tonsillectomies in Hungary and other similar operations performed in other member countries of EU.

Chapter 5 contains analysis of microbiological laboratory results. In this chapter microbial culture examination results of throat swab, from both target and control group, were presented in connection with specific health parameters, regarding the research.

The aim of the examination was to give us a picture of quantitative and qualitative differences of oral microbes flora in both groups and the presence or lack of pathogens in connection with upper respiratory diseases.

5. SUMMARY, CONCLUSION

I assumed that my hypothesis would prove to be true based on data analysis of UNFICYP, which said that upper-respiratory diseases occurred in higher ratio among Hungarian soldiers, than among soldiers from other nations in the mission. Based on the results of the research my hypothesis became true, because upper-respiratory diseases occurred provably in higher ratio among Hungarian soldiers between 2009 and 2012, than among Argentine, British, Slovakian soldiers.

I could not prove that hypothesis, which said that certain demographical factors could have affected the occurrence of upper-respiratory diseases. I did not find such demographical factor that was surely determined as an effect on occurrence of the examined diseases. During the examination of anthropometrical factors I stated that these also did not have effect on occurrence of the examined diseases.

My presumption that said other diseases, certain intercurrent but not diagnosed changes could have a connection with the occurrence of certain upper-respiratory diseases became partly proven. Result of my examinations proved that people with visible and indirect symptoms of gastroesophageal reflux disease (GERD), had pathogens in higher ratio in their microbiological samples, than in the control group. Proving the connection between the

occurrence of upper-respiratory diseases in higher ratio and GERD we need further examinations.

The low numbers of data in connection with high blood pressure disease did not bring evaluable result. According to the small number of available samples I think there is no traceable connection between occurrence of upper-respiratory diseases and high blood pressure disease.

I presumed that certain socio-cultural habits may have had an effect on occurrence of upper-respiratory diseases. Based on my results related to habits of coffee and alcohol consumption, I found out that these cannot be connected with occurrence of upper-respiratory diseases. In my examination report I stated that these take no part in occurrence rate.

Correct evaluation of the results related to sporting and smoking habits needs further examination with large number of samples and long-term follow-up study in order to be able to speak about real risk factors or effects.

That hypothesis, which said that among the two groups of upper-respiratory diseases, disorders with common cold occur more frequently, than disorders with sore throat in the examined population, was proven.

Examination of previous operations, mainly performed tonsillectomies, brought several important establishments.

Upper-respiratory infection rate and with this tonsillectomy rate were the highest in the Hungarian contingent. According to the processed statistic data it is proven that this examined factor had a dominant role in the higher occurrence of upper-respiratory diseases of the contingent.

In my working hypothesis I regarded important to clarify how often people from different nations in mission service have tonsillectomies, because I presumed that removing the pharyngeal tonsils affects occurrence of acute upper-respiratory diseases in adulthood. According to my examination results, elimination of the defensive role of pharyngeal tonsils, which is an interference changing the organism's defence mechanism, microbiological integrity, anatomical and functional statuses, has an effect on permanent presence of certain pathogens and their colonization in oral and pharyngeal cavity. In my examination report well-defined groups of respiratory pathogens were detected in larger numbers in those patients' microbiological samples, who had gone through with tonsillectomies, than in those, who had their tonsils at the time of the examination. As a direct correlation, this increase in the numbers of respiratory pathogens in the oral and laryngeal cavity can be the reason of the occurrence of upper-respiratory diseases.

I could prove the hypothesis, which said that samples of soldiers with healthy laryngeal tonsils, who did not have an actual respiratory disease contained less pathogens, than those who had had tonsillectomies and also did not have an actual respiratory disease. The research proved that samples from soldiers, who had had tonsillectomies previously, contained microorganisms from the same bacterium strains twice as often as samples from soldiers with tonsils.

My assumption related to types and strains of pathogens, which said that among the detected pathogens the dominance of Staphylo- and Streptococcus was typical was proven by the microbiological results related to both pathogens.

6. NEW SCIENTIFIC RESULTS

I was the first from the Hungarian Defence Forces, who processed and organized data of upper-respiratory diseases collected in operation zone of EU mission (adequately to the world organization's protocols) with the cooperation of soldiers, who served minimum 6 months in peacekeeping missions far away from Hungary.

In the UNFICYP mission I was the first, who analysed and evaluated health care data of several years as part of a scientific work in connection with Argentine, British, Slovakian and Hungarian contingents and I was the first who detected the typical occurrence of a certain type of disease-group, the upper-respiratory diseases in four nations from statistic data.

According to my research results I was the first, who detected that upper-respiratory disease rate is the highest among the members of Hungarian contingent in UNFICYP over several years.

I was the first, who verified the statement, which said that among soldiers serving in the UNFICYP Hungarians had a particularly high numbers of previously performed tonsillectomies. I detected that certain pathogens, which were capable of colonization, occurred more frequently among soldiers who had had tonsillectomies, than among those who still had tonsils. According to my research results, these pathogens can be connected with occurrence of upper-respiratory diseases.

During my research work I found out that, as opposed to my hypothesis, there was no deviation, neither in the examined demographical parameters, nor in the antropometrical data in connection with Hungarian soldiers, which could have been able to affect the prevalence of upper-respiratory diseases. None of the socio-cultural habits of the examined population proved that they had any effect on the prevalence of upper-respiratory diseases.

I was the first, who drew the attention to the anomalies of the current health aptitude-test system, which has conflicts in the actual laws, regulations, procedural protocol of the professional college, everyday practice and UN regulations.

I am the first who state the fact that health care data, statistic results found in the mission zone of the Hungarian Defence Forces have never been part of any research study and have never given the base of a research infrastructure in the Hungarian Defence Forces and they have not been added useful data to the military health care statistic database. Throughout my research I am the first, who indicated that data of UN missions of Hungarian contingents cumulated in 15 years have a scientific value.

7. PRACTICAL APPLICATION OF THE RESEARCH RESULTS

As a military doctor and otorhinolaryngologist, I suggest that the practical application of the research results should be examined in two aspects (general medicine, including otorhinolaryngology and military medicine).

My research results, considering the aspects of clinical medicine, have importance to create a stricter judgement of the indication of future tonsillectomies, mainly because in the risk analysis protocols the results emphasize that these types of interferences have risk of future upper-respiratory diseases.

During the everyday practice I compared the actual health status of Hungarian soldiers, including the operation of our own supply system, with the results and systems of units of other nations working in the same circumstances.

As a military doctor, my results are part of the planning-organizing work of military health care, which can help current and future missions to become more efficient. My dissertation can be curriculum and extra-curriculum to train future military health care experts, who will be delegated to deal with chief medical planning-organizing tasks of the Cyprus mission or general medical tasks of Hungarian contingent.

Results of my study enable us to alter some outdated regulations of our current health aptitude examination system with the help of practical experiences, so they give a chance of fast and correct adaptation to the international regulations and expectations.

My results indicate deficiencies in analysing procedures of health care of Hungarian Defence Forces and set out a way to eliminate these.

The applied analysis frame can be the theoretical and practical basis of creating a health care operation specific data analysing system (Health Care Operational Registry), similarly to NATO Trauma Registry, and also can provide this new system with base-data, later it can provide infrastructural basis of research in an extended form, with the integration of medical specialities' results.

8. RECOMMENDATIONS

Through my scientific results hereunder I made the following recommendations:

I indicated that there is an incorrect practice in connection with tonsillectomies in Hungary. According to this, tonsillectomies performed in Hungary exceed greatly the results of member countries and the aggregated results in the official EU statistics. In the view of this fact, applying action procedures based on professional protocols and evidences in check-up processes, treating processes and in the process of indicating an operation is highly recommended in every health care institutes of Hungarian Defence Forces.

The currently operating health aptitude-test system clashes with the actual laws (9/2002. (II.28.) HM-EüM regulation), application of action-procedures of professional college (otorhinolaryngology, allergology, clinical immunology), everyday practice, UN regulations (Medical Support Manual for United Nations Peacekeeping Operations) in connection with regarding allergic rhinitis in aptitude tests of external service. I recommend an audit of the existing elements with the help of professional representatives in order to create law and professional harmony as soon as possible.

According to my dissertation, valuable health care data, statistic results found in the mission territory of the Hungarian Defence Forces have never been part of any research study and have never given the base of a research infrastructure in the Hungarian Defence Forces and they have not been added useful data to the military health care statistic database. In order to change this practice, I recommend to create a research-organizer group of military health experts, who are experienced in operation health care in the health care system of Hungarian Defence Forces, which job would be to collect, process, analyse data of operation zones of Hungarian Army.

Budapest, 12. May 2014.