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TABLE OF CONTENTS

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Physical Fitness on Academic Performance in Youth

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Abstract

Physical fitness, as an important physical health issue, may play a key role also in brain health by affecting the academic performance of youth helping the cognitive control components to improve. Memory and cognitive skill are some of the cognitive control components that are fundamental even for academic ability. Aim: In this context, the aim of our study was to investigate and analyze the facts regarding the potential of the exercises on academic achievement improvement. Methods: In order to realize a detailed review study we used the Jab Ref as a research sector, focusing more on navigating the Medline, Google Scholar, and Inspire options that this program contains. While as the selection criteria of the collected scientific articles, we used the keywords that provided us the exact articles that stated facts about the aim of our study. Results: Authors emphasized that the development of motor skills by practicing the coordinative exercises may have a beneficial influence on the learning process improving academic performance. This comes out because of the coordinative exercise's impact on increasing the number of neuron transmitters and the new neural connections that enable youth to have a better perception regarding motor and academic situations. In addition, the authors underline the fact that the most active youth tend to perform better academically.

Keywords: physical fitness, cognitive aspects, academic ability, academic performance, youth.

Introduction

Physical fitness, as an important physical health issue, may play a key role in brain health and academic performance. Being active in life is very important because of its multidimensional effects due to many health aspects in different age groups, especially among young people providing a healthy adult. Many physical activity

benefits are clearly shown; however, some of them are still unclear. For decades, physical activity has been one of the most interesting scientific issues because of its derived benefits. Recently, the focus of many studies has been due to academic performance and its improvement via regular physical activity. Some of the data stated its positive impact on academic performance emphasizing that muscles are not the only part of the body that changes physically and chemically because of physical activity even the brain can change too. These changes are related to the improvement of the ability to be the focus or to stay alert during the learning process, influencing also the memory systems. These cognitive control components such as memory and cognitive skill are determined as the fundamental aspects of academic ability. (Irene-Cornejo et al, 2014) Despite the positive changes that physical activity may cause on academic performance, few studies show no significant impact. According to the U.S. Department of Health and Human Services, in Atlanta, 2010, children and adolescents who exercised for at least 60 minutes a day can easily get multiple health benefits. In addition to this recommendation and the multiple benefits of physical activity in children's health, many schools increased the time devoted to physical activities during school time (CDC, 2010).

This occurred even in Albanian Educational Policies, increasing the physical education classes from 2 to 3 hours per week since 2015, but there is no data regarding its impact on the learning process among Albanian children. The effects of regular physical activity on several health issues such as physical, motor, social, and emotional in youth are clearly shown by many studies, while the impact of it on academic performance continues to be unclear because of diverse data.

The impact of physical activity on improving academic performance sparked our curiosity to study more deeply about this issue. What we really want to achieve with this study is the promotion of this significant impact of physical fitness on improving academic performance. Based on how physical fitness might improve academic performance, a piece of detailed and clear information is important to build up for all of those who are or are not engaged in regular physical activity or physical education class, by motivating them due to it for a better and easier learning process.

Lopes and his colleges, in 2013 after their long review-work focused on many foreign scientific studies, revealed that the brain loves exercising. The brain undergoes several physiological changes because of physical activity, which might be responsible for many important learning process mechanisms as even Trudeau (Lopes et al., 2013; Trudeau F., et al, 2008) underlined it. Some of these brain's physiological and chemical changes that might influence positively some of learning process components are shown in table 1:

Table 1:
ImpactofPhysical Activity on Learning Process
(Based on CDC declare in 2010)

Brain's Physiological changes	*Learning Process*
Blood flow and more oxygen	*Attention*
Dopamine release	*Motivation*
Norepinephrine release, responsible for focus and attention.	*Concentration and Perception*
Growth of nerve cells in the Hippocampus, learning center of the brain	*Memory*
Serotonin release, responsible for memory, learning, regulating sleep and mood patterns	*Problem-solving*
Brain cells grow	*Mental clarity*
Development of nerve connections.	*Improved information processing*
The density of the neural network	*Learning ability*
Brain tissue volume	*Focus*

Lopes and his colleges emphasized that physical activity as an important issue that improves coordination skills can indirectly influence a better learning process as long as these skills are directly dependent on neural function and visual perception (Lopes L., et al 2013). This is one of the many reasons why the development of coordination skills is recommended for preschool-aged children. Increasing the number of neuron transmitters and new neural connections by engaging in physical activity as is recommended, enables children to better and easily percept the different motor or academic situations during the learning process. Perception is a process with some actions such as selection of impulses, organization, planning, and implementation of the created perception. The entire actions that take place in the brain are very important for the learning process.

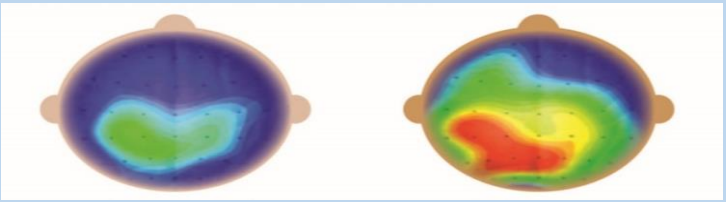
The importance of coordinative skills development is shown even by Marga Grey in 2000, as a pediatric therapist and childhood development expert. According to her, coordinative skills are very important to be developed not only for a better future life but alsofor their importance on academic performance improvements. In addition, she emphasized that the development of fine motor skills since preschool-age children is a strong acquisition for later reading and maths achieved scores. Furthermore, fluid intelligence such as logical thinking and problem-solving can be improved by bilateral coordination exercises (Marga Grey, 2000).

These positive impacts of the coordinative skills development on some learning mechanisms are emphasized even in 2018 from Macdonald and her colleague underling the importance of early fine and gross motor development have funny and easy learning process improving also their academic achievements. These positive influences are related to the increased neural connections because of coordinative exercises that are responsible even during the learning process helping the brain to get accurate problem-solving (Macdonald et al., 2018).

Other positive influences are detected in the learning process at those who participate regularly in physical activities organized during or after school. Children can be better concentrated on classroom tasks almost immediately after engaging in physical activities increasing also their standardized test score (6% over three years). These outcomes are results of **coordinative education classes** not from traditional physical education classes focused on team sports. Furthermore, better scores on academic tests by improving concentration may result even by single sessions of physical activity among children. In addition, it might reduce 21% of teachers' time managing children's academic behaviors that are also positively affected by being active.

These brain reactions come out because of some changes like increased blood circulation, oxygen volume, and nutrients improving mental activity (Robert Wood Johnson Foundation, 2015; figure 1).

Fig.1 Brain Scan Test
ACTIVE KIDS LEARN BETTER



After 20 minutes of sitting position *After 20 minutes of walking*

*** Red areas show when children are active, the blue area shows when children are less active*
(Robert Wood Johnson Foundation, 2015)

Improving perception skills is very important but before it, all teachers might ensure children's concentration and attention. If they are very concentrated on paying attention to the academic tasks, they will select the adequate visual, auditory, or tactile stimuli necessary for better academic performance.

Furthermore, *CDC in 2010* revealed that regular physical activity could provide some positive influences on cognitive skills such as attention*; memory, verbal comprehension, information processing, and motivation (CDC, 2010).*

The cognitive improvements, which reflect on the classroom test scores are supported even by *McPherson*in 2018 who detected the impact of physical activity on learning through cognition skills examined on 601 New Zealand children aged 6–11 years old *(McPherson et al., 2018).*

According to *Ericsson* and his colleagues, the development of motor skills among 7-9 years old influenced positively *attention and impulse control ability* affecting academic performance especially on *reading-writing and spatial ability in math and number perception (Ericsson, 2008).* This result showed us how important is to promote and apply physical activity like an old saying that *"Learning through playing games is more effective and funny"*.

The impact of physical activity on concentration ability during the learning process is detected since 1990 studied on children aged 11-12 years old. According to *Raviv and Low*'s results, the concentration ability is higher when physical activity is applied at the begging of the day and at the end of the lesson *(Raviv& Low, 1990).* The ability to concentrate on every task helps children to produce adequate cognitive and motor perception performing accurately the required task. Like many other researchers, even *Rasberrya and his colleagues in 2011* noticed the positive impact of physical activity on academic performance and exactly on *cognitive abilities, academic behavior, and academic achievement* supported by 50% of their reviewed articles *(Rasberrya et al., 2011).*

Another indicator of academic performance that can be influenced positively by regular physical activity is classroom behaviors, except the cognitive skills that the dominance of studies has approved. This helps children and teachers to pay more attention to the achievement of the academic task facilitating the learning and teaching process *(Fernandes et al., 2016).*

No one can remain indifferent to such findings, especially those who are part of the new generation education promoting physical activity among all school-age children and focussing on those exercises that this review showed influence on various indicators of academic performance.

2. Research Methods

Our review aimed to analyze as much data as possible in order to summarize the existed information regarding the learning process and the possible impact of physical activity on it. To gather as much data as possible data we used the electronic scientific sectors with high scientific research reliability in order to get all the comprehensive findings for this study. To be more specific, we investigated more on Research Gate, Jab Ref, Pub Med, Medline, and GoogleScholar electronic sectors. From 50 research articles detected from investigative sectors, we analyzed only 12 research articles. This focus is based on the selection criteria focusing more on the coherence of the data. We included both the experimental and observational scientific studies, without excluding the oldest one. These criteria helped us to build up a timely comparison of data about this important topic informing every school-age group, the pedagogical professional, and school policy for the children's immediate acquisition for better academic performance.

Discussion

Based on the facts that our reviwed articles, we detected that the physical fitness promotion in youth play an important role not only due to an healthy future of their social, physical and emotional development, also due to a better aand easier learning process improving their academic scores. The intellectual aspect is shown to be an addited benefit of the physical fitness affected by the systematic physical exercises participation of the youth.

In addition, most of the studies have shown the positive effect of physical activity on academic performance improving some learning indicators such *as attention, decision-making, academic attitudes, and cognitive aspects. (Rasberrya et al., 2011)* The variety of findings is the result of different methodological quality levels used, because of different Physical Activity programs implemented and the different indicators of academic performance that they examined. However, this diversity showed us the necessity to be more specific in the future about this issue.

There are studies emphasizing that the brain loves the exercise and it undergoes it due to several physiological and chemical changes that are very important for the learning process affecting them positively. (Lopes et al., 2013; Trudeau F., et al, 2008)

Being active by participating for at least 60 minutes a day in different physical activities is a demand recommendation to easily get multiple health benefits. The most recommended exercises are the coordinative one because of its influence on increasing the neuron's transmitter number and new neural connections helping children to easily percept the different motor or academic situations during the learning process. It is also emphasized that the traditional physical activity class by using team sports cannot have the same impact on academic components like coordinative skills focusing on fine and gross motor skills development (Marga Grey, 2000; Macdonald et al., 2018).

At the end of our discussion we detected that the physical fitness is essential is associated with academic performance via its impact on cognitive skill improvements such as *attention; memory, concentration, perception, decision making, problem-solving.* These cognitive improvements reflect on reading-writing, spatial ability in math, and number perception improving the academic performance.

Conclusion and Recommendation

Classroom behavior and cognitive skills are important indicators of learning process accuracy, and they can be positively influenced by physical activity helping children and teachers to pay more attention to the academic task achievements.

After a detailed analysis of the reviewed data, they were focused more on the impact of physical activity on three learning components such as **cognitive skills, academic behavior, and academic achievement**. All of this showed us a variety of changes that happen in children's brain functions and their behaviors because of P.A helping them academically. These positive impacts of physical activity on academic performance are significantly shown by many studies, despite that few of them show no significant relationship between these two variables. These diverse results enhance our responsibility as specialists in movement science to realize further studies in order to clarify these significant and positive influences of an active life due to better academic performance.

At the end of our review, we can emphasize that still this issue needs further experimental studies in order to clarify the few doubts and no significances evidenced so far.

Despite these scientific necessities for further studies, it is known that physical activity has a positive influence on the academic performance of children affecting different mechanisms of the learning process.

Findings that so far emphasized the positive influence of exercises on the learning process may inform and help school policies and pedagogical approaches to focus their priorities more on the importance of motor skills development due to better learning process since the early years of school. Furthermore, this topic is relevant to both education and teaching professionals (since preschooler and following) through the promotion of regular participation in physical activities by developing motor skills, as this may also influence due to better academic performance, should consider prioritizing all of this immediate children's acquisition.

We recommend that future studies need to focus more on the significance of physical fitness on the learning process starting from early school age and so on. Also, we recommend that the focus of physical education teachers must be on the coordinative exercises influencing the development of youth coordination skills and their cognitive abilities.

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Informing Young Girls about the Risk of HPV Infection in Developing Cervical Cancer and Preventing

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Abstract

This study aims to provide detailed information about HPV as a widespread sexually transmitted infection, which is considered one of the most important factors in the occurrence of cervical cancer in young girls,emphasizing the connection between infection.Participants were 126 randomly choosed young girls at the master's level student at Sport University of Tirana.Date were collected using a questionnaire investigating risk factors as well as knowledge on this sexually transmitted infection of HPV where through a descriptive and informative letter which was distributed to all girls participating in this study.From this study it was observed that a significant number of them were aware of the virus and ways of transmission 81 girls (64.28%),of which 22 girls (17.46%) had in hearing that it was a sexually transmitted virus, 11 girls (8.73%) had read that this virus could cause cervical cancer, 9 (7.14%) of whom had heard of an HPV-related vaccine,while 3 of them (2.39) refused to complete this questionnaire.From the data collected in this study it was noticed that information and awareness campaigns should be carried out immediately for this age group as the most at risk in relation to sexually transmitted infections and in particular HPV,enabling in this form the ability to care more specifically for their health thus preventing very dangerous pathologies such as cervical cancer.However for this aspiration to be realized,in practice requires a greater understanding on the part of these young girls of the natural history of early HPV infection and its role in creating cervical epithelial abnormalities.

Keywords: Information, HPV, cervical cancer, prevention

1. Introduction

Human papillomavirus (HPV) infection is a very common sexually transmitted infection.This Infection with high-risk types of HPV is now considered to be a

necessary, but not sufficient, cause of cervical cancer (1).A large majority of women are usually infected soon after they become sexually active in their early teens nowadays (3).Persistent infection with at least one of the 12 high-risk HPV types is a necessary but not sufficient cause of all cervical cancers and part of vaginal, vulvar and oropharyngeal cancers (2).Cervical cancer is mainly caused by HPV 16 followed by HPV 18 which together cause 71% of this pathology worldwide (4).We can also say that most of these infections can be eliminated on their own within a period of time (5).But young girls in whom the virus persists for a long time may be predisposed to exhibit epithelial changes which are a high risk factor for developing cervical cancer in the future (6). Also various concomitant factors may play a specific role in the persistence of this infection increasing the risk of developing cervical lesions (7).These can depend on various causes such as genetic factors, long term use of oral contraceptives, smoking and other sexually transmitted co-infections (8,9).Where as one of the main factors it is worth mentioning the high number of sexual partners as well as the beginning at a very young age of sexual intercourse which increases the exposure to the HPV virus (10,11).Cervical cancer remains the most common sexually transmitted infection with an annual incidence 6.2 million,80 million infected are between 15-49 years.Cervical cancer kills 270,000 women a year and 9.2 million sexually active young people aged 15-24 are infected with genital HPV (12).It also occupies the second place with (7%) among malignant tumors in women and occupies the first place with (40% of cases) among genital tumors in Albania (13).Where we must emphasize that the biggest problem appears in early adolescence as the most dangerous period in sexual development in young people associated with several developmental factors such as sexual development, emotional development.Where we should consider that the biggest problem appears in early adolescence as the most dangerous period in sexual development in young people associated with certain developmental factors such as sexual development, emotional development.At this age of adolescence there is no proper information about emotional, sexual maturity, as well as sexually transmitted infections and this is a fundamental problem in the way of approaching different situations which pose a high risk for come in contact at a very young age (14).Where we must keep in mind that sexual development begins at puberty at the age of 12-13 years which appears and with an increase in interest about sexual intercourse.What should be noted is that in Albania these data are very evasive and especially in these age groups are almost missing.For this reason, informing the masses of this age group and not only is very important to prevent. Where the main focus is to provide sufficient and accurate knowledge of how this virus is transmitted and referring to the measures taken in some countries to prevent the occurrence of this disease in vulnerable individuals associated with vaccination against certain types of human papillomavirus in young girls to prevent the occurrence of cervical cancer associated with those types and is potentially the most effective form for health care (16).This as it eliminates not only the disease itself, but also its consequences and refers to the measures taken to identify and treat asymptomatic subjects who already have preclinical disease, and

thus prevent the progression of the disease in these already sick individuals where it is intended to minimized the effect of the impact to the disease.What is worth noting is that full knowledge and detailed information against all the risk factors that are determinants provide an opportunity to identify the disease at an early stage, in which the disease should be treatable, as well as treatments should be able to change the natural history of the disease in a favorable way.

2. Methodology

A questionnaire was the instrument used to collect the information needed for the study.This study is a survey which is expressed as a percentage in a certain group of subjects. It was a 10 item questionnaire distribuited to 126 young girls at the master's level student at UST during the period November 2018- July 2020.It aimed to collect information for the knowledge that these girls have about the human papilloma virus and how updated they are in relation to the high risk that this virus poses to them in the future.A questionnaire investigating risk factors for HPV infection,and during the completion of the questionnaires all the girls were first explained the reason for this study and were helped during the completion of the questionnaire when they had uncertainties and in this way a detailed profile of social, sexual and behavioral risk factors was collected. Questions were regarding socio-demographic characteristics like the educational level in general for sexually transmitted diseases and ways of transmission,smoking,age at first menstruation, age at first intercourse.And in the second part of the questions were asked about the HPV virus could cause cervical cancer, and vaccination as a preventative measure, as well as if you were given the opportunity would they do it.Of wich 126 questionnaires only 123 are valid,because 3 of them refused to complete.

3. Results

This group of questions was designed to generate a general idea to understand how much knowledge these young girls have about this virus and the need for more detailed information about the symptoms and the risk it may pose if it is not detected in time.It consists of ten questions.In the first part of the questionnaire participants have to identify potential risk factors such as socio-demographic data, gynecological history, health and sexual life behaviors, and reproductive data.The second part of the questions asked to elicit the information they have about prevention such as HPV vaccination and screening.The study found that a significant number of them 81 girls (64.28%) they had no knowledge of the HPV virus and modes of transmission. 22 of them (17.46%) had heard that it was a sexually transmitted infection and that it was also related to their sexual behavior,such as the number of sexual partners and the beginning of the first intercourse. 11 girls (8.73%) had information that this virus can cause cervical cancer where only a fraction of these lesions will progress to high-grade cervical intraepithelial neoplasia. 9 of which (7.14%) knew about the vaccine as one of the ways of prevention besides screening, and 3 girls (2.3%) refused to be part of this study.

4. Discussion

Detailed and specific information about HPV taking into account the mode of transmission and care to be shown in relation with the sexual behaviors can raise awareness to conduct examinations like cervical cancer screening programmes may be effective in reducing mortality from cervical cancer, but they do so at the expense of substantial over-diagnosis and unnecessary treatment (15). Although the treatment of pre-malignant changes in the cervix is therapeutically efficacious,it is also procedurally inefficient.Infection with high-risk types of the human papillomavirus (HPV) is the most important risk factor for cervical cancer all these should be known extensively by these girls who having a high level of knowledge thus increase the awareness to be examined in time,and in view of this he clearly understand how important it is to prevent in time .

5. Conclusion

From what is noticed in this study, young people should be informed about sexually transmitted infections and especially against HPV in order to be able to take care specifically of their health by preventing in the future dangerous pathologies such as cervical cancer. And this can only be done through occasional information and awareness campaigns. Also vaccine is one of the most valuable ways of prevention besides screening.The vaccine protects against 90% of the HPV types they cause cervical cancer and 90% of HPV types that cause genital warts (17). Referring to the data every young girl should be able to research and recognize ways of prevention as a right to take care of their health, and early detection of the first signs of lesions caused by HPV is the main point of prevention study to determine the natural history and aetiology of early cervical neoplasia, in young women. This type of study should include an even larger group of girls starting from adolescence where the risk is even higher and to inform them in more detail about this infection and the risk it poses if not prevented in time.This study is also an indication to conduct in the future a more comprehensive study on the lack of information that was identified in relation to the mode of transmission and prevention and to increase in this way their awareness to show caution about risk factors.

6. Recommendations

Information programs and measures should be developed to ensure high coverage and high participation, at the educational level. There are adequate facilities for obtaining cervical striae and adequate laboratory facilities are available to examine them.It is sufficient to have a high level of information and to refer to a specialist doctor. Evaluation and monitoring of comprehensive programs to help and counsel these young girls should be organized effectively. There should be a carefully designed referral system for managing any abnormalities found and for providing information about normal screening tests, providing convenience in the required

service.It has been suggested that the link between cervical HPV infection and cervical neoplasia could be utilized to improve the effectiveness and efficiency of primary and secondary cervical cancer prevention programs.Achieving these improvements still requires a greater understanding of the natural history of early HPV infection on the part of and by setting key objectives regarding prevention and subsequent treatment.

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Influence of Implementation of Composite Materials in Maritime Industry on CO_2 Emission's Reduction

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Abstract

The future of the composites market looks attractive with opportunities in the transportation, construction, wind energy, pipe & tank, marine, consumer goods, electrical and electronics, aerospace, and others. The composite materials market is expected to reach an estimated $40.2 billion by 2024 and it is forecast to grow at a CAGR of 3.3% from 2019 to 2024. The composite materials that have started to be used in the production of tourist boats, especially those of the yacht type, have proved in practice the designers' expectations for the great advantages they have brought compared to steel. The performance of the new generation ships of this millennium, will require the ever-increasing use of new and innovative materials, to meet the also growing demands of potential buyers of these vehicles. On the other hand, based on the already sanctioned principles of the European Community for the observance of the norms set for CO2 emissions from maritime transport - (Green shipping) in respect of the Kyoto Protocol on Climate Change, it becomes more necessary to produce marine vehicles that significantly reduce the weight of marine vessels, consequently engine power and fuel consumption by significantly reducing CO2 emissions. This study aims to bring a specific analysis of the impact of composite materials to the CO2 emission's reduction.

Keywords: composite materials and composite market, performance of marine vessels, climate change, CO2 emission's reduction, software simulation.

Introduction

As an incentive for this article, was the study carried out by the I Care Consulting Company in collaboration with the partners of the PASSAGE Project - Interreg Europe Program on CO2 Emissions in the European Maritime Strait, including the Otranto Strait.

This study identified the source of CO2 contamination by Otranto, considering several factors: economic activity, maritime transport, inland transport, and human activity.

Straits have unique geographies, and are characterised by diversified and specific economic activities, including transportation, industrial activities, tourism, services, and manufacturing. Straits are important centres of communication, commerce, and culture.

Straits include cities with an important population living on coastlines, and thus particularly vulnerable to global environmental change, such as rising sea levels and coastal storms. Additionally, all these economic activities may be a significant, and growing, sources of energy consumption and account for a significant percentage of greenhouse gas (GHG) emissions. [1]

This may include not only GHG emissions from "land based" activities (ports, industries, cities, tourism), but also "sea based" activities, such as domestic or international maritime transportation. Therefore, straits may play an important role in tackling climate change and responding to climate impacts, bringing an integrated management approach, considering marine areas and hinterlands, on both sides of the strait.[2]

As for cities, strait's ability to take effective action on mitigating climate change and monitoring progress, begins with developing a GHG inventory; a "carbon study". Such an inventory will first enable straits to understand the main emissions contribution of different activities taking place at strait level. It may then allow straits to determine where to best direct mitigation efforts, where to best consolidate partnerships with key stakeholders, and finally create a strategy to reduce GHG emissions. [3]

The clear definition of the concept of maritime straights helps to analyze the impact that maritime transport brings to the level of CO2 emissions.

Defining a strait: perimeter, activities

From a geographical point of view, a strait is a narrow stretch of water between two landmasses joining two marine expanses. Unlike cities, for which we can generally base studies on administrative boundaries, a strait is a complex area comprising a maritime space and a terrestrial interface, with a spatial dimension that can be subject to discussion and interpretation depending on the purpose of this definition. Moreover, there is no administrative boundary for a strait (although there are different administrative boundaries within a strait), and thus it is necessary to take into consideration functions and activities of a strait to be able to propose and justify a specific boundary. [4]

From a functional point of view, a strait is the crossing-point where the crossing is the shortest possible. It is thus a core node of transport and communication, with a "bridge effect" stepping up maritime connections (ferries, container transport, ro-ro ferries etc.) or fixed links (bridges and tunnels). A strait be a transportation hub organized around the main ports on both side of the strait, involving longitudinal (between the main ports of the strait) and transit flows of goods and people through the maritime corridor. Economic activities, as well as in-land transportation are then

induced by theses flows through the maritime corridor [5]

Main GHG emission sources at strait level

Calculation of CO2 emissions in the maritime strain considers the major activities that are developed in the straight according to the concept defined for it, as described in the table No1

Ports operation: including energy consumption of the buildings in the port and of the ships in the port areas.

Maritime transport: including local, international (with calls to the strait's ports) and transit maritime cruise. This emission source was included in most of the inventories, depending on the local availability of data. The local maritime cruise data was collected from the ports and/or the local maritime companies. The international maritime cruise data was collected from the ports, and the transit maritime cruise was collected from the coastguards

Table 1: Technical and economic activities in the Straight

Ports	• **Port operations**: port-owned and leased vehicles, buildings, port-owned and operated cargo-handling equipment, port purchased electricity for port administration-owned buildings, lighting and operations • **Ships in port areas**: In fairway channel, at anchor, in port basin, maneuvering, at berth
Sea-based	• **Local maritime cruise**: traffic between port-to-port inside the strait (Ferry, fishing) • **International maritime cruise**: emissions due to ships arriving / departing from the port located in the strait • **Transit maritime traffic**: emissions « inside » the strait without calls at straits' ports
Land-based	• **Road-railway-fluvial trafic**: origin/destination of goods handled in the ports' area • Tunnel • **Induced economical activities** (ex: fishing, tourism, etc...)

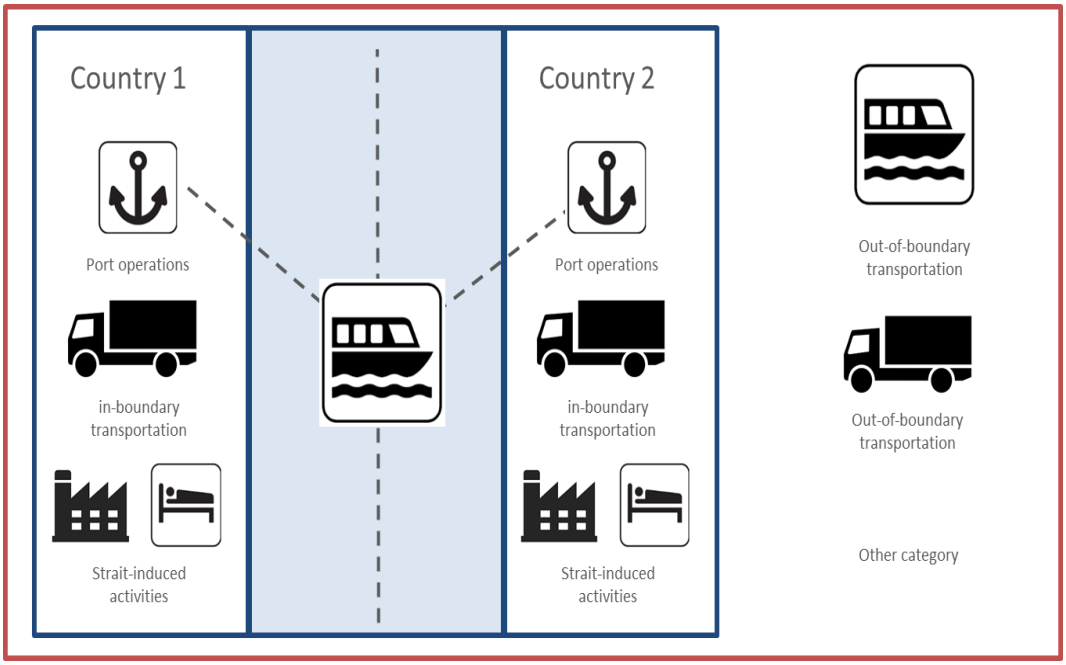
In-land traffic: including road, railway, waterways transport from and to the ports and tunnel transport if appropriate. This emission source was included in all the inventories based on local and national statistics on the quantity of merchandise transported, the number of passengers passing through the ports, the mode of transport and the distance travelled. This emission source represents between 3% and 20% of the emissions within the strait.

Induced economical activities: including industries and residential and commercial

activities. This emission source was included in all the inventories based on European data on the emissions from industries (in the EU-ETS database), and on the emissions from residential and commercial activities per capital.

The analysis methodology includes the collection of statistical data regarding the number and typology of economic enterprises operating in the coastal area at the perimeter of the straight, the number of vessels anchored in the port of Vlora, the number of vessels transiting the Strait of Otranto, the number of Port shipyards, as well as the processing duration, the number of land transport vehicles to the Port, statistics on the number of people around the straight as is described in the Fig No1.

Fig No 1 – Diagram of technical and economic activity in the straight



Otranto straight CO_2 Emissions

The Strait of Otranto (Albanian: Kanali i Otrantos; Italian: Canale d'Otranto) connects the Adriatic Sea with the Ionian Sea and separates Italy from Albania. Its width from Kepi I Gjuhes, Karaburun, Albania to Punta Palascìa, east of Salento is less than 72 kilometres (45 mi). The strait is named after the Italian city of Otranto. The strait of Otranto has a very strategic position and for centuries has been a key to control all traffic flow from Mediterranean to Adriatic seas.

Fig 2 – Strait of Otranto

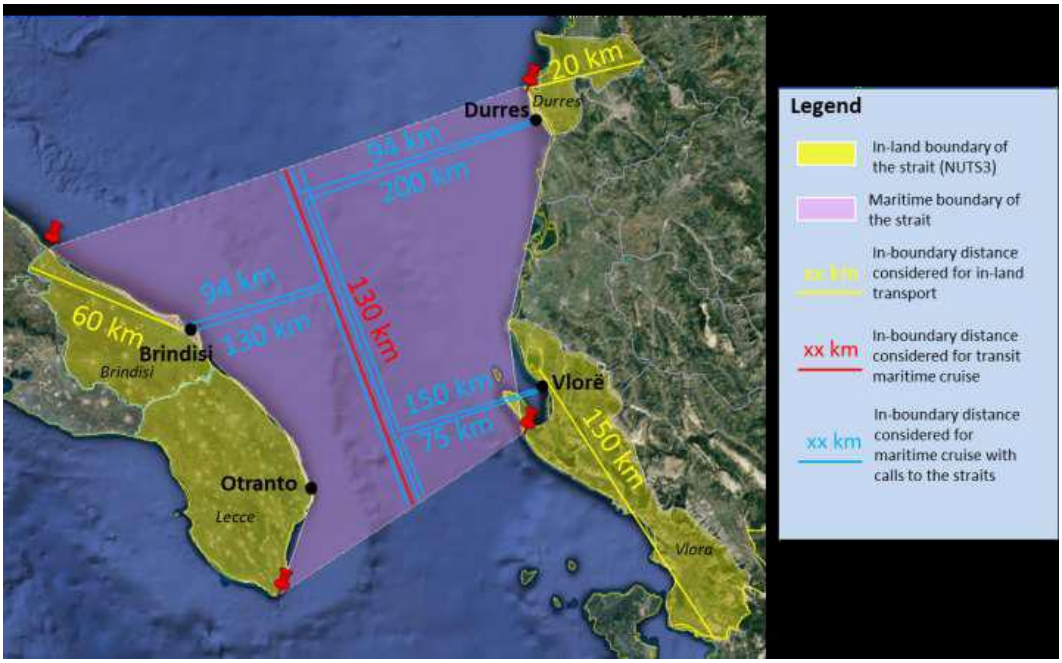
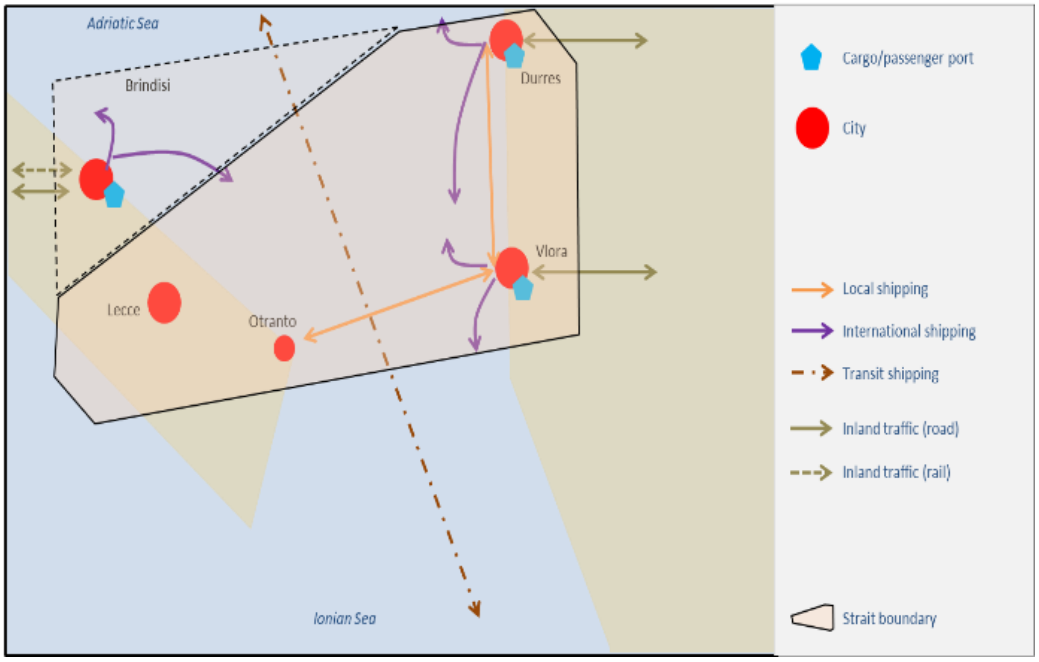


Fig 3 – Diagram of maritime transport activities

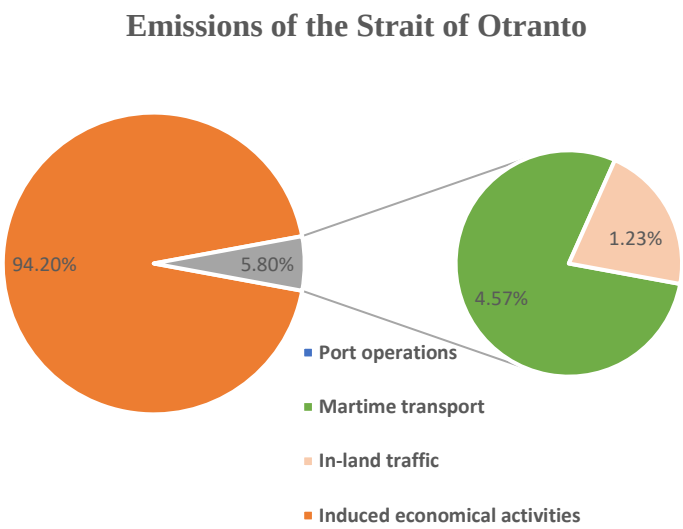


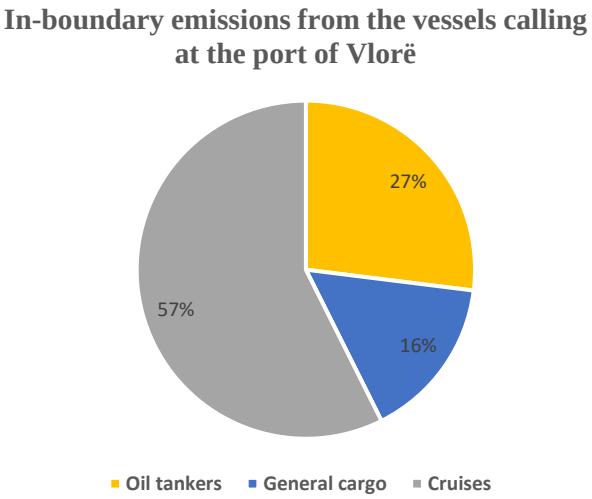
From the analysis of the data for the variables defined in the diagram the calculation

of CO2 emissions resulted: 94% of the emissions in the strait are generated by economic activity, 5 % by sea transport and 1% by land.

If we will go more in details for the maritime transport Co2 emissions define by category of vessels 57% of in boundary emissions are generated from the cruises, 27 % from oil tankers activity and 16 % from cargo activity.

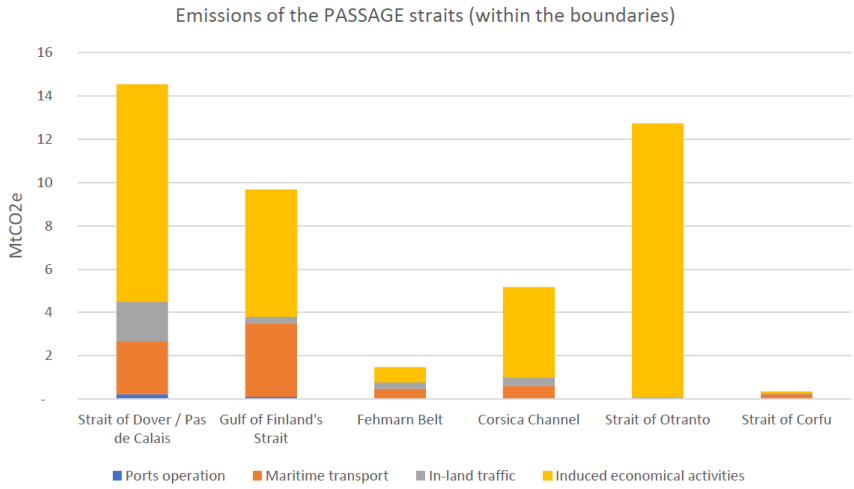
Graph 1 – Emissions in the Otranto Strait





If we compare the level of CO2 emissions in the Strait of Otranto with those of other European Straits, we find that the total level of emissions in the Strait of Otranto is 12.5 M Ton. 95% of CO2 emissions in this strait are attributed to economic activities.

Graph 2 – Emissions of the Passage Straights



At the strait level, the application of the national objectives (disaggregated by sector) results in a reduction of the emissions by 36% by 2030, compared to 2016.

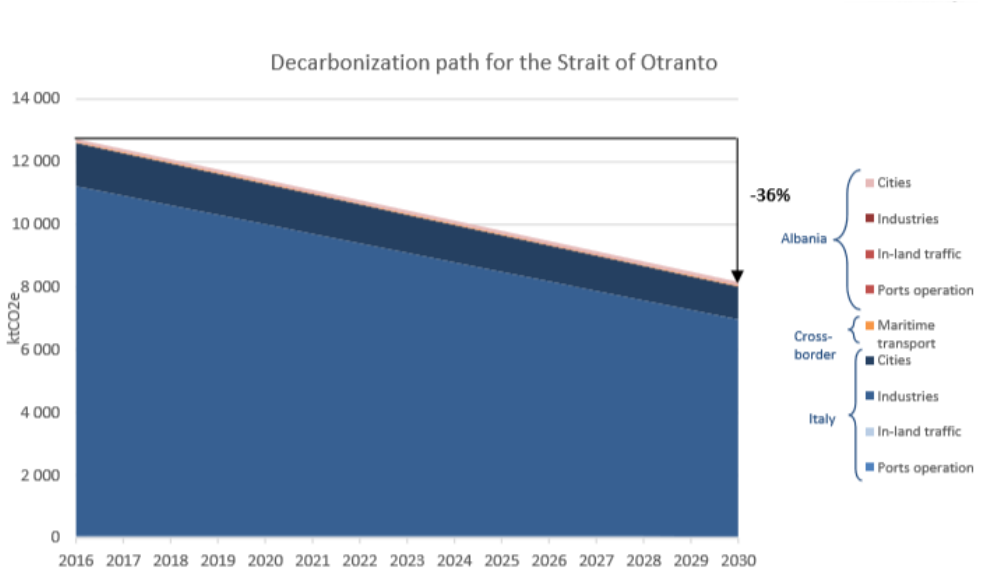
The following table presents the main hypothesis made to estimate the decarbonization path of the Strait of Otranto.

Table No2 – Table of hypothesis for decarbonisation in the Strait of Otranto

Emission source (within the strait's boundary)	Source of hypothesis	% of reduction	Emissions 2016 (tCO_2e)	Emissions 2030 (tCO_2e)
Port operations	European Commission's target on CO2 emissions from maritime transport	-40% between 2005 and 2050 (corresponding to -12.3% between 2016 and 2030)	NC	NC
Maritime transport	European Commission's target on CO2 emissions from maritime transport	-40% between 2005 and 2050 (corresponding to -12.3% between 2016 and 2030)	31 432	27 566
In-land traffic	Transport target in Italian National Energy Strategy and Albania's Target in INDC	IT: -16% between 2016 and 2030 AL: +47% between 2009 and 2030 (corresponding to +30.6% between 2016 and 2030)	64 157	58 380
Industries	Industry target in Italian National Energy Strategy and Albania's Target in INDC	IT: -38% between 2016 and 2030 AL: +47% between 2009 and 2030 (corresponding to +30.6% between 2016 and 2030)	11 163 390	6 921 302
Buildings	Building sector target in Italian National Energy Strategy and Albania's Target in INDC	IT: -24% between 2016 and 2030 AL: +47% between 2009 and 2030 (corresponding to +30.6% between 2016 and 2030)	1 468 585	1 161 873
TOTAL			**12 727 564**	**8 169 120**

This reduction is due to the actions implemented at all the levels (national, regional, local) and corresponds to the path that is being taken with the actual strategies. The emissions can also be reduced by implementing new actions specifically on the strait's boundary.

Graph. No 2 – Decarbonisation paths for the Straight of Otranto



Based on the decarbonisation paths for the Straight of Otranto 2016-2030 the action plan for Albania will be focused on three main thematic axes.

Table No 3 – Action Plan for decarbonisation in the Straight of Otranto

Thematic axes	Cross-border
Port operations	• Energy efficiency certificate for the port buildings
Maritime traffic	• Energy efficiency on maritime transport vessels – Green shipping
Induced economical activities	• Local government supporting climate change mitigation • Green certificate for tourism

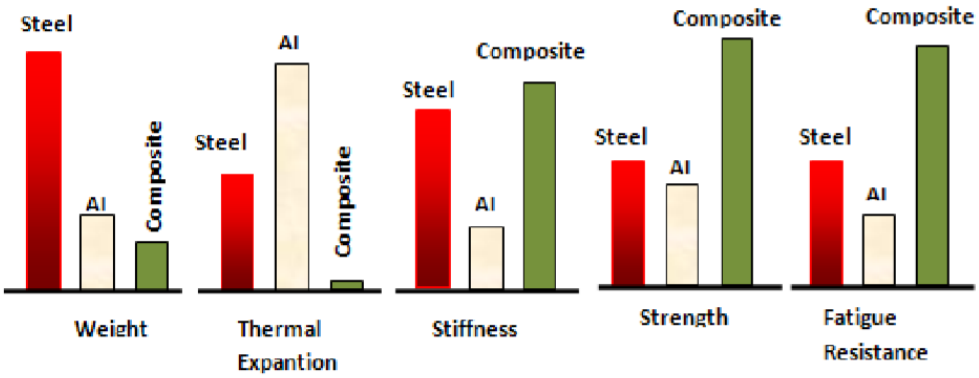
Composite materials and their performance

As described above, maritime transport is one of the relevant polluters in the Otranto Straits. Energy Efficiency in Shipping is proposed in the Decarbonization Action Plan. From this point of view, the reduction of the motor power of the marine means is one of the directions of interference. The design and construction trends of ships are those of realizing the final product with a total dislocation as small as possible.

As is known from Archimedes' law, minimal deployment means the minimum diving volume of the vehicle, which, on the other hand, contributes to a lower resistance to movement, better hydrodynamic characteristics with a reduction of the surface of the vessel (in the case of yachts with sail) or motor power installed in the case of motor yachts; a better ride comfort, lower cost of construction and vehicle utilization, increased navigation autonomy, especially in the case of large sized cruise vehicles.

If we take in consideration the physical and mechanical parameters (fig. No 4) the composite material has very good performance for the weight comparing to the metallic materials.

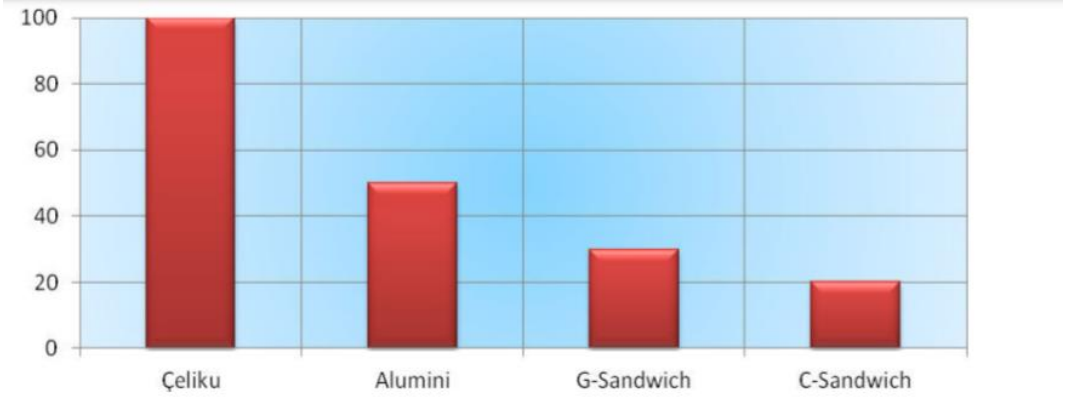
Fig. No 4 – Physical and mechanical parameters for vessels materials



The designers of these ships always face the constant challenges of creating more and more efficient structures, while facing higher demands on national and international safety standards and norms. Saving weight in many naval structures has long been considered one of the most important problems by attracting the attention of researchers and naval projectors.

An approximate weight factor estimate in marine structures is shown in Figure 35 (Based on the recommendations given in Ref.86). Thus, aluminium structures are about 50% lighter, compared to those of steel. Glass fibre reinforced plastic (FRP) sandwiches are 30-50% lighter than light alloy structures (aluminium). Carbon FRP sandwiches are 30% lighter than glass FRP sandwiches.

Fig – Saving weight for vessels based on the material



A marine material with composite material can be constructed with a weight much easier than other materials (steel) and, consequently, this tool requires an installed power of up to 25% less for the same vehicle performance. This enables the choice of an easier engine, creating better opportunities for its maintenance and repair. A smaller weight of the engine means even more access to other board accessories, thus increasing the degree of comfort.

A smaller installed power means less fuel consumption and, consequently, a lower cost of storing this vehicle from their owners. Understandably, the cost also depends on the cruise times of the vehicle. The greater the time it is to use, the greater is the saving of monetary values.

Steel and aluminium structures can guarantee an almost constant maintenance cost up to the first 15 years of service. Then its chart begins to grow very rapidly, because of steel corrosion and the appearance of cracks due to aluminium fatigue. Current manufacturing technologies with composite materials have eliminated the osmosis phenomenon, making the tools maintain the aesthetic side, not exhibit structural degradation, and maintain the maintenance cost constant up to 20 years or more of the lifecycle of the product.

To quantitatively assess this phenomenon, let's take a simple case of a vessel calculation.

Thus, a steel patrol vessel, depending on its use profile, can spend carriages up to an equivalent of $ 800,000 a year. A reduction in installed power (due to the use of composite materials) of 25%, means an engine with 25% lower power, 25% less fuel consumes, 25% less CO2 emissions, in total means a saving of $ 200,000 a year.

Conclusions

So, to achieve the second objective energy efficiency in marine vessels the best solution will be the use of composite materials to produce the marine vessels.

The use of composite material in the production of marine vehicles reduces their weight, creates the possibility of installing a fewer motor power than the floating memories produced with metallic material, creates opportunities for a higher standard of comfort, adding accessories to interior design.

The use of composite materials creates possibility of installing a fewer motor power and for consequence less fuel consume, less carbon emissions.

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Preventive and Interceptive Orthodontics Treatment

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Abstract

Preventive orthodontics is that part of orthodontic practice which is concerned with patients and parents education, supervision of the growth and development of the dentition and cranio-facial structures. The diagnostic procedures undertaken to predict the appearance of malocclusion and the treatment procedures instituted to prevent the onset of malocclusion. Interceptive orthodontics has been defined as that phase of science that can recognize and eliminate potential irregularities and malpositions of the developing dento-facial complex. Many of procedures are common in preventive and interceptive orthodontics, but the timings are different. Preventive procedures are undertaken in anticipation of development of a problem, whereas interceptive procedures are taken when the problem has already manifested. Orthodontic problems in children can be divided conveniently into non skeletal and skeletal problems, which are treated by tooth movement and by growth modification. Such treatment may take place in deciduous or transitional dentition and may include redirection of ectopically erupting teeth, slicing or extraction of deciduous teeth, correction of isolated dental crossbites of recovery of minor space loss.

Keywords: preventive orthodontics, dentition, malocclusion, malpositions, deciduous teeth

Introduction

Many of the procedures are common in preventive and interceptive orthodontics but the timings are different. Preventive procedures are undertaken in anticipation of development of a problem. Whereas interceptive procedures are taken when the problem has already manifested**.** Purpose of early orthodontic treatment: To intercept developing problem. To prevent obvious problems from becoming worse. To correct obvious problems. To remove the etiologic factors and restore normal growth. To reduce the severity of skeletal problems, making possible easier and more precise tooth positioning in adolescence.

Purpose of early orthodontic treatment. To intercept developing problem. To prevent obvious problems from becoming worse. To correct obvious problems. To remove the etiologic factors and restore normal growth. To reduce the severity of skeletal problems, making possible easier and more precise tooth positioning in adolescence.

2. Methodology

Preventive orthodontics include treatment of: Natal teeth, Occlusal relationship, Eruption Problems, Space maintenance. Natal teeth: Present at birth or erupt shortly after birth. Most frequent in lower incisor region. Only 10% are supernumerary therefore removed only when interfere with feeding or causing tongue ulceration.

Cross bites of Dental Origin: Correction of dental crossbites in the mixed dentition is recommended, because it eliminates functional shifts. The most common etiologic factor for non skeletal anterior Crossbites is lack of space for the permanent incisors**.** It is important to focus the treatment plan on management of the total space situation, no just the crossbite. If the developing crossbite that is discovered before eruption is complete and overbite has not been established the adjacent primary teeth can be extracted to provide the necessary space.

Prevention and timely restoration of carious teeth. The deciduous teeth are natural space maintainers. Simple preventive procedures like: Application of topical fluorides & fissure sealants.

Management of ankylosed tooth: Ankylosis is a condition characterized by absence of the periodontal ligament in small area or whole of the root surface.

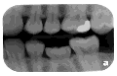

Fig 1 Ankylosis of teeth **Fig 2**

This radiograph demonstrates both anterior and posterior teeth tipping over adjacent ankylosed primary molars. The ankylosed teeth should be removed if significant tipping and space loss are occurring.

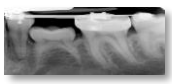

Fig 3

Supernumerary & supplemental teeth can interfere with eruption of nearby normal teeth. They deflect adjacent teeth and erupted teeth in abnormal positions. They should be identified and extracted before they cause displacement of other teeth.

Fig 4 Supernumerary teeth Supplemental teeth

Space maintenance: Premature loss of deciduous teeth can cause drifting of the adjacent teeth into the space. Space maintainers must be inserted in appropriate cases after the loss of deciduous teeth. Space maintainer appliance is different intra oral removal of fixed appliance.

Fig 5 Space maintenance

Fig 5 Over-Retained Primary Teeth

Over-Retained Primary Teeth: A permanent tooth should replace its primary predecessor when approximately three fourths of the root of the permanent tooth has formed. Once the primary tooth is out, if space is adequate, moderately abnormal facial or lingual positioning will usually be corrected by the equilibrium forces of the lip, cheeks and tongue. A primary tooth that is retained beyond this point should be removed because it leads to: Gingival inflammation ,Hyperplasia that causes pain and bleeding .

Ugly duckling stage: The spaces between the incisors, including the midline diastema, decrease and often completely disappear when the canines erupt .While their crowns diverge distally,this condition of flared and spaced incisors is called the "*ugly duckling"* stage of development. These spaces tend to close spontaneously, when the canines erupt and the incisor root and crown positions change.

Fig 6 Ugly duckling stage

Procedures undertaken in interceptive orthodontics: Serial extraction, Correction of developing crossbite, Control of abnormal habits, Space regaining, Muscle exercises , Interception of skeletal malrelation, Removal of soft tissue or bony barrier to enable eruption of teeth.

Serial extraction: Planned and timely removal of certain deciduous teeth followed by certain permanent ones, to allow normal alignment of permanent teeth.

Advantages of serial extraction: Reduces the severity of malocclusion, Reduces the extent of mechanotherapy, Reduces the duration of treatment.

Disadvantages of serial extraction: Chances of increasing overbite, Canines may fail to migrate distally, anterior teeth may tip lingually.

Correction of developing crossbite. Anterior cross bite is a condition characterized by reverse overjet, where in one or more maxillary anterior teeth are in lingual relation to the mandibular teeth.



Fig7 Dento-alveolar Skeletal Functional

The crossbite should be intercepted and treated at an early stage to prevent a minor orthodontic problem from progressing into a major dento-facial anomaly. The best time to treat a crossbite is the first time it is seen" Or else it may grow into skeletal malocclusion" Correction of developing crossbite.

Methods of correction of developing anterior crossbite:

Fig 8 Tongue blade

Disavantages :It is effective only during phase that clinical crown has not erupt totally in oral cavity. It is used only when we have adequate space for correction. Indications: It is used only in cases when crossbite is due to palatal movement of maxillary incisive. It is putted in an angle of 45 degree in lower anterior and is made of acrylic or metal.

Fig9

Control of abnormal Oral habits. Habit's refers to certain actions involving the teeth and other oral or perioral structures, which are repeated often enough by some patients to have a profound effect on the positions of teeth and occlusion. Oral habits should be recognized early and patient should be helped to give up by motivation or by fitting a suitable habit breaking appliance.

Some common habits: Thumb / digit sucking,Tongue thrusting, Mouth breathing, Lip sucking / biting.

Functional appliance are used. These appliances are equipped with accessories that train tongue to the new position. Correct the position of teeth (close anterior open bite).

Mouth breathing as habitual respiration through the mouth instead of the nose.

Usually seen in people with nasal obstruction may also occur as a habit. If persists, Vestibular Screen / Oral Screen can be used.

Lip bumper. It is positioned in the vestibule of the mandibular arch & serve to prohibit the lip from exerting excessive force on the mandibular incisors.

The myobrace interceptive appliance system is designed specifically to correct poor oral habits. It is more effective before a child permanent teeth are coming through ages 5 to 8.

Fig10 Lip bumper Myobrace interceptive appliance

Space regainers in the form of removable appliances or fixed appliances are used to regain the space by moving the drifted teeth back to their original position. Premature loss of deciduous teeth causes migration of the adjacent teeth into the edentulous space. This cause inadequate space for the eruption of the permanent teeth.

Fig 11 Space regainers

Conclusion

The mal occlusion may be accepted or be treated in a variety of ways. The natural growth change which follows the completion of the treatment may spoil fine results. Interceptive procedures can to some extent prevent or reduce the severity of malocclusion. In the treatment at early ages the orthodontist can reasonably become "Re director" of growth pattern rather than solely concerned about tooth position.

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The Repetitive Behavior Scale-Revised: Independent Validation in Children with Autism Spectrum Disorders and a Control Group in Albania

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Abstract

A key feature of autism is restricted repetitive behavior (RRB). Despite the significance of RRBs, little is known about their phenomenology, assessment, and treatment. The objective of this study is the vvalidation of the Albanian version of the RBS-R in an independent sample of ASD children**.** In order to validate the RBS-R in an independent sample, a survey was conducted in Albania at National Center of Childrens' Rehabilitation including 30 children with autism spectrum disorders (ASD) and a control group of 30 children without ASD. Factor analyses produced a five-factor solution that was both clinically meaningful and statistically sound, namely: Ritualistic/Sameness Behavior, Stereotypic Behavior, Self-Injurious Behavior, Compulsive Behavior and Restricted Interests. Measures of internal consistency were good for this five-subscale solution. The effects of baseline characteristics (age and gender) were examined. Cronbach's alpha was used to measure internal consistency. The alpha values for the five subscales, ranged from 0.72 (Stereotypic) to 0.85 (Ritualistic/ Sameness Behavior). All values are within or above the acceptable range for research purposes. The Albanian version of RBS-R appears to have sound psychometric characteristics and can be used to differentiate various types of repetitive behaviors.

Keywords: Autism, Repetitive behavior, Stereotypies, Assessment, Rating scale

Introduction

In recent years, much of the work on the features of autism has focused on core social and communication deficits of the disorder, rather on restricted and repetitive behavior, which is also a core feature (Lewis & Bodfish, 1998; Rutter, 1996).

In order to address more complex RRBs observed in people with autism Bodfish and colleagues expanded the original RBS to include more complex RRBs by adding items assessing ritualized behaviors, insistence on sameness, and restricted interests. This resulted in the current 43-item RBS-R. Items are rated on a four-point Likert scale ranging from (0) ''behavior does not occur'' to (3) ''behavior occurs and is a severe problem,'' and raters are asked to refer to the previous month when completing the scale. The items of the RBS-R have been conceptually grouped (i.e., based on clinical experience) into six subscales. These include: (a) Stereotyped Behavior (movements with no obvious purpose that are repeated in a similar manner); (b) Self-injurious Behavior (actions that cause or have the potential to cause redness, bruising, or other injury to the body); (c) Compulsive Behavior (behavior that is repeated and performed according to a rule or involves things being done ''just so''); (d) Ritualistic Behavior (performing activities of daily living in a similar manner); (e) Sameness Behavior (resistance to change, insisting that things stay the same); and (f) Restricted Behavior (limited range of focus, interest, or activity).

The objective of the present study was to assess the factor structure and some psychometric characteristics of the RBS-R in an independent sample of children with autism spectrum disorders and a control group of children without ASD in Albania. It was hypothesized that the six-factor structure of the RBS-R would be confirmed via exploratory factor analysis.

Method

Participants

The participants in the factor analytic study of the RBS-R were 30 children with autism spectrum disorders (ASD) at National Center of Childrens' Rehabilitation in Tirana, Albania and a control group of 30 children without ASD matched for age and gender in order to assess the effects of subject variables on repetitive behavior.

Instrument

Translational validity was undertaken to ascertain whether the content of the questionnaire was appropriate and relevant to the study purpose. All questionnaires were completed by the same interviewer, thus, eliminating the interviewer's bias.

Data Analysis

The analyses was carried out on the whole sample using the software SPSS 16.0. Mean scores were calculated for both cohorts and compared. A p-value <0.05 indicated statistical significance. Normality of distribution was tested and data of a significant

nature had non-parametric tests conducted. To evaluate the internal consistency of the measures Cronbach's alphas were calculated for each of the RBS-R subscales and full scale, for the first and second measurement. To examine the construct validity of the RBS-R, exploratory factor analysis was performed first. A principal component extraction was used, after which the number of factors was determined by both eigenvalues (>1) and the scree test.

Results

Age ranged from 3 years to 9 years with a mean of 15.34 (SD = 9.60; median = 13.0). Ratio of gender was 2:1, males/females, for both ASD children and Control group.

There were 20 males (67%) and 10 females (33%).

The comparison of means between ASD and Control for the RBS-R in the beginning of the study yielded significant difference between them for all subscales and full scales highlighting the substantial occurrence of repetitive behavior among ASD children compared to the controls. (Table 1).

Table 1. Comparison of Means between ASD and Control for the RBS-R in the beginning of the study

Subscale	ASD	Control	*t*	P
	Mean *(SD)*	**Mean *(SD)***		
Stereotypic	7.8 *(6.4)*	2.1 *(3.3)*	-5.4	**<0.01**
Self-Injurious	4.8 *(7.5)*	0.7 *(2.1)*	-4.6	**<0.01**
Compulsive	9.5 *(8.2)*	2.6 *(4.7)*	-5.5	**<0.01**
Ritualistic	7.5 *(5.8)*	2.0 *(3.6)*	-8.5	**<0.01**
Sameness	14.9 *(9.2)*	2.5 *(5.3)*	-6.4	**<0.01**
Restricted Interests	6.3 *(4.7)*	1.5 *(2.7)*	-6.6	**<0.01**
Total score	50.8 *(41.8)*	11.4 *(21.6)*	-4.4	**<0.01**

Factor Analysis of the RBS-R

The rate of endorsement was calculated on the basis of dichotomous (present/not present) data, which were created by collapsing severity ratings 1 through 3. None of the items were eliminated; the frequency of endorsement ranged from 13.3% (item 13: ''Inserts finger or object'') to 66.7% (item 40: ''videotapes''). Table 2.

Exploratory factor analysis using the inter-item correlation matrix from the 43 items of the RBS-R. 12 eigenvalues were extracted accounting for 81.6% of the total variance.

5 eigenvalues were retained accounting for 59.3% of the total variance.

The number of factors to retain was guided by: (a) the scree plot method (b) eigenvalues above 1.0 (c) interpretability.

The extraction method was Principal Component Analysis.

The number of factors to retain was guided by: (a) the scree plot method (b) eigenvalues above 1.0, and (d) interpretability. Solutions between two and six-factors were evaluated using these criteria. Items were adopted as loading on a given factor if (a) they loaded 0.35 or higher on that factor. Examination of the factor solutions indicated that either a four-or five factor solution could be adopted.

The five-factor solution with promax rotation was chosen as most appropriate for this sample due to interpretable factors. In comparing this five-factor solution with original six subscales, the main difference is that the five-factor solution collapsed the original Ritualistic Behavior and Sameness Behavior subscales into one (''Ritualistic/Sameness'') subscale.

Ritualistic Behavior means ''performing activities of daily living in a similar matter,'' and Sameness Behavior means ''resistance to change, insisting that things stay the same.'' It makes clinical sense that performing a ritual is strongly related to a need for sameness and consistency, as the present factor analysis indicates. Although the original Ritualistic Behavior subscale is oriented more towards activities and the Sameness Behavior subscale includes more references to specific objects, they share the construct of the need for invariance in both activities and in the environment.

Another important difference emerged by the present study in regard to Restricted Interests subscale. One of this subscale's four items did not load on one-factor, one item (item 41: Attached to object) resolved onto ''Ritualistic/Sameness'' subscale.

Given the small sample size the subscales encompass the minimum set of three items to consider loading on a factor. The subscales meet the minimum standards in terms of factorial structure.

The mean factor loadings for factors I through V were 0.71, 0.69, 0.66, 0.61 and 0.62, respectively.

Table 2. Frequency of endorsement

	Frequency of endorsement	**%**
Stereotypy Subscale		
Body movements	25	41.7
Head movements	28	46.7
Finger movements	32	53.3
Locomotion	36	60.0
Object usage	21	35.0
Sensory	31	51.7
Self-Injurious Subscale		
Hits w/ body	17	28.3
Hits against surface	14	23.3
Hits w/ object	11	18.3
Bites self	17	28.3
Pulls hair/skin	9	15.0
Rubs/scratches	8	13.3
Inserts finger/object	8	13.3
Picks skin	14	23.3
Compulsive Subscale		
Ordering	38	63.3
Completeness	25	41.7
Washing	19	31.7
Checking	28	46.7
Counting	27	45.0
Hoarding	27	45.0
Repeating	26	43.3
Needs to touch/tap	17	28.3
Ritualistic Subscale		
Eating/mealtime	26	43.3
Sleeping/bedtime	25	41.7
Self care routine	31	51.7
Transportation routine	34	56.7
Play/leisure routine	28	46.7
Communication	31	51.7
Sameness Subscale		
Placement of objects	26	43.3
No new places	31	51.7
No interruption	31	51.7
Walks certain way	16	26.7
Sits certain place	11	18.3
Appearance/behavior of others	32	53.3
Uses certain door	22	36.7
Videotapes	40	66.7
Difficult transitions	32	53.3

Insists on routine	30	50.0
Insists on time	32	53.3
Restricted Subscale		
Preoccupation with subject	36	60.0
Attached to object	25	41.7
Preoccupied with part of object	25	41.7
Preoccupation with movement	34	56.7

Table 3. Five-factor principal components analysis

	Factors				
	1	**2**	**3**	**4**	**5**
Stereotypy Subscale					
Head movements			.596		
Finger movements			.757		
Object usage			.727		
Sensory			.595		
Self-Injurious Subscale					
Hits w/ body		.805			
Hits against surface		.722			
Hits w/ object		.707			
Rubs/scratches		.830			
Inserts finger/object		.392			
Compulsive Subscale					
Completeness					.484
Checking					.647
Hoarding					.626
Repeating					.588
Needs to touch/tap					.767
Ritualistic/ Sameness					
Sleeping/bedtime	.683				
Self care routine	.763				
Transportation routine	.763				
Play/leisure routine	.658				
Communication	.716				
Placement of objects	.728				
Appearance/behavior of others	.682				
Videotapes	.682				
Difficult transitions	.708				
Insists on routine	.812				
Insists on time	.695				
Restricted Subscale					
Preoccupied with part of object				.530	
Preoccupation with movement				.690	

Item-total Correlations

Subscale scores were calculated by taking the integer weightings (0 –3) scored by the interviewer and totaling them for all items in the subscale. As a way of validating the five-factor structure, item-total correlations were calculated. Each of the remaining 27 items on the RBS-R was correlated with the subscale scores (item-deleted) of Ritualistic/Sameness Behavior, Self-injurious Behavior, Stereotypic Behavior, Compulsive Behavior, and Restricted Interests. All items correlated most highly with their hypothesized subscale (Table 3). The mean item-total correlation for Ritualistic/ Sameness Behavior was 0.74 (range from 0.64 to 0.84); for Self-injurious Behavior, 0.62 (range from 0.42 to 0.83); for Stereotypic Behavior, 0.63 (range from 0.53 to 0.80); for Compulsive Behavior, 0.69 (range from 0.45 to 0.85); and for Restricted Interests, 0.78 (range from 0.73 to 0.84). The RBS-R items are highly correlated to their own hypothesized subscales and moderately correlated to other subscales.

Internal Consistency

Cronbach's alpha was used to measure internal consistency, which is the extent to which an item is correlated with the remaining items from its subscale. The alpha values for the five subscales, listed in Table 4, ranged from 0.72 (Stereotypic) to 0.85 (Ritualistic/ Sameness Behavior). All values are within or above the acceptable range for research purposes.

Table 4: Internal Consistency and Item–scale correlation of RBS-R (n = 60)

Scale	Coefficient alpha	Item-scale correlation	P value (2-tailed)
Stereotypic	0.72	0.55 - 0.80	<0.01
Self-Injurious	0.81	0.42 – 0.83	<0.01
Compulsive	0.80	0.45 – 0.85	<0.01
Ritualistic / Sameness	0.85	0.64 – 0.84	<0.01
Restricted Interests	0.70	0.73 – 0.84	<0.01
Whole scale	0.92	----	

Reliability/stability over time

The analysis of responses between the test and the retest was conducted using Spearman non-parametric statistical test to compute the correlations between subscales of the first and second measurement. Correlation coefficients *(rho)* ranged from 0.94 – 0.99. The Wilcoxon non-parametric statistical test was used for the full scale to determine whether there were any significant differences between the responses at each time point: P value for ASD was 0.98 and for Control was 0.87.

The high correlation between the scores at the two time points along with non significant differences in the P values at the level of 0.05 in the responses to the items between the two tests indicates the instrument is stable over time.

Effects of Subject Characteristics on RBS-R Scores

In an effort to evaluate the effect of subject characteristics: (a) the age was split age (0 through 5 years, 6 through 9 years) (b) gender (male, female), for both ASD children and Control.

Gender. A trend ($p < 0.05$) for a gender effect was found on the stereotypic subscale, with males showing higher levels of occurrence than females. Table 5.

Age. There is no significant trend for age for the six subscales and for the total score.

Table 5. The efect of gender

Subscale	Male	Female	*t*	P
	Mean *(SD)*	**Mean *(SD)***		
Stereotypic	9 *(6)*	5.4 *(6.1)*	-2.2	**0.04**
Self-Injurious	5.4 *(7.9)*	3.8 *(6.3)*	-1.4	0.2
Compulsive	8.7 *(8.3)*	11.2 *(7.7)*	1.2	0.2
Ritualistic	7.2 *(5.7)*	8.1 *(6.3)*	0.7	0.5
Sameness	13.5 *(9.4)*	15.9 *(8.3)*	0.7	0.5
Restricted Interests	6.3 *(4.8)*	6.4 *(4.7)*	0.1	0.9
Total score	50 *(42.1)*	50.8 *(39.4)*	0.06	0.9

Discussion

As far as could be determined, this is the first study in print to determine the subscale structure of the RBS-R through factor analysis in Albania. Although the results do not fully support Bodfish and colleagues' conceptually-derived six-subscale structure, the solutions are quite similar overall. The current study has a disadvantage of a relatively small sample size over Bodfish's principal components analysis. Hence, the five-factor solution is likely to be more stable and reproducible than the original six subscale approach, although this will need to be addressed through subsequent research.

The psychometric characteristics of the 5-subscale version of the RBS-R appear to be sound. The finding that the RBS-R can be used to differentiate various types of repetitive behaviors is an important step in the study of autism in Albania. Autism is a very complex, heterogeneous disorder, and the RBS-R may be particularly useful in identifying subgroups that may have prognostic or diagnostic utility. In addition, the RBS-R may be a useful tool in the assessment of treatment effects. The current

findings also suggest that the expression of RRB in autism may be modulated by a multitude of subject characteristics, and these relationships require further study. It is clear that repetitive behavior is highly correlated with the overall severity of autism, which provides further evidence for their clinical significance.

Although the study of repetitive behavior is in its infancy relative to the study of the social and communication domains in autism in Albania, the validation of the RBS-R provides an important step towards their future study.

Overall, the five-subscale, 27-item scoring method for the RBS-R appeared to have sound psychometric characteristics. The RBS-R may be a used in the assessment of treatment effects and the course of the illness.

Crohnbach's alphas for all of the subscales were satisfactorily high. However, the restricted interests factor is a weakness of this subscale and more research is needed in the future to avoid any kind of bias arising from small sample size and from the language of the questionnaire.

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Prophetic Medicine: Building an Epistemological Framework to Overcome the Conflict between Religion and Evidence-Based Medicine

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Abstract

Prophetic medicine (PM) is the body of medical advice given by the Prophet Muhammad (the Prophet of Islam). Although various theories have been advanced to explain the articulation of PM in Islamic history, the most coherent theory is that PM was articulated by Islamic scholars to reconcile the Prophet's medical advice with Greek medicine. In a similar fashion, faced with the current-era domination of the medical scene by Evidence-Based Medicine (EBM), some Muslim researchers have hastened to attempt combining EBM with PM by using EBM tools to validate PM. A literature review revealed four features shared by most of the current PM studies. First, they were conducted in Islamic countries. Second, their main purpose was to confirm the validity of PM. Third, they lacked a consistent epistemological framework. Fourth, they used deductive reasoning that treated PM as absolute truth in their introductory sections, restricting their purpose to proving the validity of PM and leaving no room for refutation. To draw more effectively on the PM heritage without contradicting current scientific method, it is instructive to extract and adapt the methods used by earlier Islamic scholars to combine PM with Greek medicine. After an extensive textual analysis of the books of the Prophet's sayings (Hadiths) and scholars' commentaries, the methods by which scholars combined PM and Greek medicine were extracted. The study concludes by proposing several models that combine PM with EBM. The closest model found to acknowledge the holiness of the Prophet's Hadiths without contradicting the scientific nature of EBM is to limit the divine validity of the Prophet's medical Hadiths to those to whom the Prophet prescribed the medicine, without including those who came after them in later times. This approach opens the door to benefiting from these Hadiths as indicating possible directions for modern scientific research without calling the Prophet's prophecies or the validity of his words into question.

Keywords: Prophetic Medicine, Epistemological Framework, Conflict between Religion and Evidence-Based Medicine

Introduction

Background

In the view of its proponents, prophetic medicine (PM) is defined as the collection of sayings and advice (i.e., Hadiths) given by the Prophet Muhammad, peace be upon him (PBUH), regarding sickness, treatment, nutrition, and hygiene (Perho ,1995). The phrase "Islamic medicine" is sometimes used interchangeably with "prophetic medicine"; however, it is widely accepted in the literature that the former embraces all kinds of medical practice consistent with Islamic law throughout Islamic history, whereas the latter deals only with medicine originating with the Prophet (Hussein, 2019). The formation of PM had its roots in the definition of Islam and the value among Muslims of the Prophet's Hadiths (Grenon,2018). Muslims believe that their religion has two main sources: the Qur'an, which contains the words of God, and the Hadiths, which contain the words of the Prophet (Al-dhahabi,2004). This means that all Hadiths are by default instances of divine revelation unless additional evidence shows otherwise, as when the Prophet explicitly attributed a Hadith to himself and not to God (Al-Qarafi,1995). Chronologically, the evolution of PM can be separated into four periods, as suggested by Grenon (Grenon,2018). The first period took place between the 8th and 9th centuries CE, when the original collections of Hadiths were assembled by Hadith scholars such as Al-Bukhari, who devoted a special chapter in his book (Sahih Al-Bukhari) to the Prophet's medicine (Grenon,2018). The second period took place between the 10th and 12th centuries, when some scholars started using the term "prophetic medicine" and authored specialized books devoted exclusively to PM Hadiths (Grenon,2018). In this period, there was no discussion or implementation of medical theory; rather, there was a narrative list of Hadiths organized by topic in the order followed by contemporary Greek medical books with some brief commentary (Grenon,2018). The authors of PM texts in this period were Hadith scholars such as Ibn-Sunni and Abu-Nuaim (Grenon,2018). A possible reason that the books in this period followed the organization of Greek medical texts was the intention to make PM more attractive to physicians who were not interested in Hadith texts (Perho ,1995). Indeed, by the end of this period, PM was an interest shared by Islamic scholars and physicians (Grenon,2018). The third period in the evolution of PM was seen when Islamic scholars gradually began to include Greek medical theory (i.e., Galenic medicine) in their books in such a way that its consistency with PM was evident (Grenon,2018). This period took place between the 12th and 13th centuries and continued until the 14th century, when the fourth period emerged with the most extensive efforts yet to define PM and affirm that PM had become a medical system in itself (Grenon,2018). In this period, scholars such as Ibn al-Qayyim and Al-Dhahabi wrote books on PM showing that PM could stand alone in terms of its comprehensiveness and divine source. However, Greek medical theory was merged

with PM in a way that respected both the observable value of Greek theory and the divine source of PM (Ragab,2012).

The reason Islamic scholars developed PM and devoted such efforts to defending its validity is not mentioned in early Islamic books (between the 8th and 19th centuries) (Ragab,2012). This omission was due to the view of most Islamic scholars that PM is sacred and a part of divine revelation, which means that no one—other than God—has created it (Ibn al-Qayyim,1994). There is another underrecognized Islamic view, which sees PM as a worldly affair that was taken from traditional Arabic medicine of the Prophet's period with no divine source; according to this view, the Prophet's mission was to preach Islam, not medicine (Ibn Khaldun,2004). This view was adopted by some scholars, such as Ibn Khaldun and Al-Qadhi Ayad; however, reverence for the holiness of the Prophet caused this view to remain unrecognized in the Islamic world until the present (Grenon,2018).

Among orientalists, the reason for the development of PM was a matter of controversy in the last two centuries (the 19th and 20th) (Fujii,2011). Some claimed that the purpose of articulating PM was to oppose the reason-based Greek medical tradition and prevent its intrusion into the Islamic world, and since PM was not reason-based, magic-based and religious superstitions were introduced into PM books (Bürgel,1976; Ullmann,1978; Savage-Smith,1997). This extreme view was refuted by Fazlur Rahman and Irmeli Perho, who believed that the perceived urgency among Islamic scholars of defending PM and showing its compatibility with Greek medicine came after PM was attacked by some Christian physicians who argued that it contradicted Greek medicine and thereby attempted to discredit the prophecies of Muhammad (PBUH) (Perho ,1995). Rahman and Perho argued that PM did not oppose Greek medicine; rather, it combined the Prophet's Hadiths with Greek medicine with the purpose of spiritualizing medicine and showing that no conflict existed between PM and Greek medicine (Perho ,1995; Rahman,1987). The view of Rahman and Perho is supported by the fact that most PM books contain sayings and quotations from Greek physicians such as Galen and Hippocrates with no sign of rejection (Ibn al-Qayyim,1994).

This norm of combining PM and Greek medicine continued until the 20th century, when positivist philosophy revolutionized and invigorated the field of medicine with its insistence that medical knowledge can be derived only from experiments and observations (Bradley, 2006). Although other types of medicine make use of other reasoning styles, as for instance Chinese medicine reasons deductively from an established theory to explain single observations, inductive reasoning (which moves from observations to developing a theory), in the eyes of positivism, is the most appropriate way to reach the truth (Wieringa, 2018; Serdar, 2011). This movement resulted—by the end of the 20th century—in the establishment of what is called "Evidence-Based Medicine (EBM)" (Sackett,1996). EBM's main goal is to combine clinicians' experience with medical research to arrive at correct, well-formed

decisions that improve patient health (Sackett,1996). EBM relies on all types of medical research, from basic medical research (e.g., molecular biology, immunology, and pharmacology) to clinical experiments applied to humans (i.e., clinical trials) (Sackett,1996). From the point of view of EBM, any medical practice not based on scientific evidence is pseudoscience and should be avoided (Lee, 2015). Nowadays, it is widely accepted that in order for any treatment to be trusted as effective, safe, and reliable, its justification must follow the scientific method, from basic medical research to clinical trials (Lee, 2015). However, reliance on EBM does not mean that other sources of medicine (e.g., Chinese Medicine, Energy Therapy, Acupuncture, or PM) are not effective or safe. Rather, EBM requires that these types of therapies be validated by means of the scientific method in order to be incorporated into EBM (Tonelli, 2001). What gives EBM its strong stance in relation to other types of medicine is its pragmatic approach, tangible clinical benefits, and common acceptance around the world (Lambert, 2006). It can be assumed that EBM stands alone in this regard and is the benchmark against which all other medical approaches are judged, not vice versa (Sackett,1996).

As EBM has dominated the medical arena since the last century, the practice of Greek medicine has faded away, with the exception of its ethical guidance (such as the Hippocratic oath) and philosophical foundations, which deprived magic of the role it had played in medicine and encouraged the use of logic and experience instead (Cosans,1998).

In the wake of EBM's rise to dominance, the task of Islamic scholars and thinkers has shifted from reconciling PM with Greek medicine to reconciling it with EBM (Ragab, 2012). This new reconciliation effort coincided with the Islamic revival of the 1970s and 80s, and one feature of this revival was the wide reach of television programs introduced by Islamic scholars and thinkers emphasizing the claim that there is no contradiction between Islam and modern science (Ragab, 2012). This discourse, with its promotion of Islam, has led to the establishment of a new movement "among some Muslim physicians and researchers" to use EBM techniques (i.e., basic medical research and clinical trials) to confirm the validity of PM (Ragab, 2012). However, there is a contradiction at the heart of this approach. For, in the view of its proponents, PM is of divine origin, and its authority is absolute. To validate it by means of EBM techniques is indirectly to contradict the presumption of its divine authority since if it is indeed authoritative because of its origin, there should be no reason to look to EBM or any other source for validation (Serdar,2011). This epistemological contradiction seems not to have been recognized by current PM proponents; instead, hundreds of so-called scientific articles using EBM to validate PM have been published in the last 30 years (Azizah,2018; Ijaz,2017; Ahmed, 2013). In addition, scientific committees, postgraduate programs, and national conferences have been established in some Islamic countries with the aim of establishing the validity of PM in a scientifically sound manner so as to give it scientific credibility alongside its divine authenticity (Hussein, 2019).

Illustrating this epistemological contradiction within PM research does not mean that the PM research should stop, since PM is a valuable source of medical information used in the Arabian Peninsula during the Prophet's time. Rather, it means that there is a need to establish an epistemological framework that both preserves the value of EBM as the only authoritative resource for medical information and respects the sanctity of the Prophet's and God's revelations by not claiming sanctity and authenticity for something whose divine origin has not been proven.

This paper, therefore, proposes a new epistemological framework that aims to overcome the conflict between PM and EBM. To achieve this goal, the paper is divided into three parts. The first part is a mini literature review that examines the medical articles seeking to use EBM to validate or establish the correctness of PM. The second part is a textual analysis of opinions written by Islamic scholars seeking to resolve the conflict between PM Hadiths and some aspects of Greek medicine. Finally, the third part applies the information extracted from the previous two sections to construct an epistemological framework that accommodates the most useful logical reasoning in EBM (i.e., inductive reasoning).

Methods

The methods section is divided into three parts: mini literature review, textual analysis, and establishment of an epistemological framework.

Mini literature review

The purpose of this review is to describe the current status of PM in medical literature and to characterize the way this literature has conceptualized PM and determined its role in reaching particular conclusions. The studies included in this review are those that mentioned or expressed approval of PM and used EBM techniques such as basic medical research, clinical trials, or clinical reviews in their methodology.

Search strategy

A rapid mini-review using PubMed and Google Scholar with no time restriction was conducted on December 5, 2021, to identify all studies using EBM to validate or defend PM. The only keyword used for this review was "prophetic medicine"; this was done deliberately so that all related articles would show up (Figure 1).

Inclusion and exclusion criteria. This review included all studies that used EBM techniques to validate or defend PM. The EBM techniques searched for were: cell and tissue studies, animal experiments, clinical trials, case studies, observational studies, and systematic reviews or review articles. All studies that were included mentioned PM in at least one section of the study (a particular focus was placed on the introduction and discussion sections). The exclusion criteria included not being in the English language and not having an abstract.

Data extraction and data analysis. Where available, the following information was extracted from each study: article type, country where the study was conducted,

country where the publishing journal was published, funding source, where PM was mentioned in the article, what treatment was mentioned, and whether the treatment was beneficial according to the study. No appraisal tool was used since the review design was exploratory in nature and not systematically structured.

Textual analysis

The main goals of this textual analysis were (1) to identify all PM Hadiths recounted in well-known Islamic Hadith collections and in scholars' commentaries on these collections and (2) to describe the way Islamic scholars handled conflicts between some PM narrations and some aspects of Greek medicine.

Identifying major Islamic Hadith collections that included PM Hadiths

It is widely accepted among Muslims (especially within the Sunni school of thought, which comprises approximately 85% of all Muslims) that there are six collections of Hadiths generally recognized as the main sources of the Prophet's sayings and quotes (Almazri,1988). These collections are: Sahih al-Bukhari, Sahih Muslim, Jami al-Tirmidhi, Sunan Abu Dawood, Sunan an-Nasa'I, and Sunan ibn Majah (Almazri,1988). These collections were used to identify the PM Hadiths in this study (Table 2).

Identifying books that included scholars' commentaries on PM Hadiths plus additional sources

Given the importance of the six collections of Hadiths just mentioned, Muslim scholars devoted tremendous effort to interpreting these collections and confirming the authenticity of the Hadiths recounted in them (Karimov,2019). These efforts resulted in many long commentaries on the six collections. Given this abundance, only 16 famous commentaries were chosen for reference in this section of the study. During the reading of these commentaries, nine additional commentaries were added as references because they included instructive discourse about PM and its relationship with Greek medicine. All the Hadith collections and commentaries are listed in Table 2.

Extracting all PM treatments mentioned in Hadith collections

The reading of the Hadiths was followed by extraction of all the PM treatments and targeted diseases mentioned there. These treatments and diseases were then used as keywords to locate the related information in the commentaries. The list of PM treatments and diseases included the following: Ajwa date, Aloe Vera, Antimony, Armenian cucumber, Ascites, Ash, Barley flour, Black seed, Camel milk, Camel urine, Cassia Angustifolia, Cauterization, Cow's milk, Ceylon cornel, Cold water, Costus spicatus, Cucumis, Cupping, Diet, Dill, Ethmid, Fennel flower, Fever, Fly wing, Hair shaving, Head band, Headache, Henna, Honey, Insect, Itchiness, Kuhl, Leprosy, Lice, Migraine, Phoenix dactylifera, Plague, Pleurisy, Salvadora percis, Sciatica, Senna, Silk, Talbina, Truffle, and Zamzam water.

Extracting and analyzing the techniques used by Islamic scholars to resolve apparent contradictions between PM and Greek medicine

All scholars' comments relating to PM Hadiths were extracted. The comments that did not illustrate and resolve a conflict between PM and Greek medicine were excluded from the analysis. This resulted in a set of scholarly comments exclusively devoted to resolving this conflict. The techniques used by the scholars to resolve the conflict were analyzed. In some commentaries, the comments were compared or referred to previous commentaries written by other scholars; if these comments were redundant or similar to what had already been found in the previous commentaries, the original comments were retained, and the redundant ones were excluded.

Establishing an epistemological framework

Several epistemological frameworks arising from the results of the first two stages were discussed, and two were singled out as the most appropriate for resolving the conflict between EBM and PM. Epistemology as a branch of philosophy addresses questions regarding the definition, source, and scope of knowledge (Wenning,2009). Although epistemology is complicated and rich in styles of reasoning, such as deductive reasoning, it is currently held in the medical field that inductive reasoning guided by positivist philosophy is the most efficient and practical way to approximate clinical truth (Djulbegovic,2009). The original Aristotelian (syllogistic) style of deductive reasoning used two or more propositions (assumed to be true) to reach a conclusion or decision (Khemlani,2012). In contrast, the deductive reasoning used in medicine nowadays deviates from the original syllogistic style by assuming that it is possible to start with only one proposition, and this proposition is not assumed to be true (Shin,2019; Bolton, 2015). Rather, the proposition is a theory or hypothesis to be accepted or refuted based on the collected data. This is the use of deductive reasoning as a hypothesis-testing strategy (the hypothetico-deductive method). In contrast, inductive reasoning aims to generate a hypothesis by collecting data first and letting patterns in the data guide the generation of a theory (Shin,2019; Bolton, 2015). The hypothesis-testing use of deductive reasoning, therefore, relies on data in a way that makes the data the only source of validation for the theory. This makes this application of deductive reasoning analogous to inductive reasoning in that both rely on data to lead to the truth and neither asserts the theory as fact in advance—in contrast to PM, where the Prophet's Hadiths are assumed to be factual by PM proponents (Shin,2019; Bolton, 2015). Accordingly, and since it is EBM procedures that are being used to test the assumptions of PM, the original Aristotelian (syllogistic) style of deductive reasoning was not included in this section. Rather, the inductive and current medical deductive (hypothetico-deductive) reasoning frameworks were used. These two styles of reasoning were selected and combined with the techniques used by Islamic scholars to resolve conflicts between EBM and PM. Then, possible frameworks were discussed, and the most appropriate one was

chosen to be the proposed framework. Figure 2 conceptualizes the steps followed by inductive and deductive reasoning in this section.

Results and Discussion

Mini literature review

The initial search of PubMed and Google Scholar resulted in the retrieval of 2,340 studies (Figure 1). After the removal of studies that were duplicates, unrelated, not in English, or missing an abstract, 538 studies remained. Screening the abstracts of these 538 studies resulted in the removal of 413 more because they did not use EBM techniques to defend PM. A total of 125 studies therefore remained for the final assessment (Figure 1). These studies were conducted in 18 countries and covered a period between 1999 and 2020. Of the 125 studies, 86.4% (n = 108) were undertaken in Asia (Saudi Arabia (n = 52), India (n = 21), Pakistan (n = 9), other (n = 26)); 12.8% (n = 16) were undertaken in Africa (Egypt (n = 12), Algeria (n = 3), Nigeria (n = 1)); and 0.8% (n = 1) were undertaken in other countries (Australia (n = 1)) (Figure 1).

Regarding the study types, 48.8% were review articles, followed by tissue or cell experiments (21.6 %) and animal experiments (13.6%) (Table 1). Clinical trials with no phase mentioned comprised 12.8 % of the studies; there was no clinical trial whose phase (such as 1 or 2 or 3) was mentioned. The funding sources of the studies were highly varied; however, four universities located in Saudi Arabia accounted for the funding of 33.6% of the studies, with King Abdulaziz University responsible for more than any other (13.6%) (Table 1).

As specified in the inclusion criteria, all studies mentioned PM. Most (92.8%) mentioned it in their introductory section.

Regarding the PM treatment types examined in the studies, black seed (alone or in combination with other ingredients) accounted for 53.6% of the studies, followed by cupping therapy (19.2%) and other treatment types (27.2%). All but two studies resulted in positive findings and hence concluded that the PM treatment was beneficial (Table 1).

The mini-review results showed that PM studies were mainly conducted and funded in Islamic countries. For example, 41.6% of the studies were conducted in Saudi Arabia, the “home of Islam,” where the holy cities of Mecca and Madinah are located, and where the Prophet Muhammad lived and died (Shin,2019). Additionally, 33.6% of the studies were funded by Saudi universities, which creates the potential for bias in these studies. Respecting the Prophet and believing that he speaks from more than simply his own inclination are parts of the Islamic faith (Rahman,1987); hence, Muslim medical researchers might find it extremely difficult to describe some of his sayings or actions as incorrect or unscientific. Not only that, some of them may believe that loving the Prophet requires them to defend all his words and deeds, using all means of proof, including EBM (Ragab,2012). Accordingly, it is not surprising that

there are so many studies in Islamic countries defending PM by means of EBM and other resources.

Although the exploratory nature of the mini-review precluded assessing the quality of the studies it included, there are signs pointing to quality concerns with some of these studies. For example, review articles and systemic reviews constituted almost half of all studies reviewed, which contrasts with the general pattern in research wherein most research on a particular topic consists of original studies, while review articles on the topic are in the minority (WHO, 2017). A possible explanation for the disproportionate number of review articles on PM is that there was a rush of researchers seeking to prove the validity of PM regardless of the logical evidence-building sequence that is standard in the medical field (Ragab,2012). This explanation is supported by the nature of the clinical trials that were included in this review. None of these trials specified a clinical phase (e.g., phase 1, phase 2, or phase 3), which may be considered a sign of negligence in haste to confirm preselected conclusions in support of PM.

The majority of the studies reviewed mentioned PM with approval in the introductory section. This means that these studies simultaneously used hypothetico-deductive reasoning to confirm the validity of PM and assumed that PM's validity stems from its divine origin and needs no proof—a self-contradictory stance (see Introduction). All studies bar two found that PM was beneficial, which raises concerns regarding possible publication bias toward positive results. It is evident in general that publication bias is prevalent in the case of clinical trials and that there is a tendency to report only positive results (Dwan, 2008), and PM studies are no exception, especially given the ideological motive to defend PM.

To summarize the results of this mini-review, most of the studies in effect followed a caricature of the hypothetico-deductive method that assumes the validity of the claim first and then conducts experiments, not to test its validity, but only to prove it. Accordingly, the scientific method here is only a tool to reach a predetermined conclusion, an approach that flies in the face of the entire scientific method and especially the concept of falsification, whereby the research claim in question—in order to be scientific—must be falsifiable and subject to possible rejection (Popper,1963). This epistemological contradiction, however, should not preclude making use of the PM Hadiths and testing their validity in modern times. It simply means that doing so requires a new look at the epistemological model used in PM and finding an adaptation that is consistent with modern EBM as well as the Prophet's Hadiths. This reform requires a deep textual analysis of the Hadiths and books of commentaries to extract the methods used by Islamic scholars to resolve the conflict between PM and Greek medicine in their time. Those scholars found it essential to develop methods to defend PM against those who attacked its validity on the grounds that it contradicted some aspects of the common medicine of their time, i.e., Greek medicine (Perho.1995). It is justifiable, therefore, for current Islamic researchers to

adapt the old methods or develop new ones to reconcile PM with currently prevalent medicine (i.e., EBM).

Textual analysis

In general, most scholars' commentaries on the PM Hadiths did not mention any conflict between PM and Greek medicine. Only a few scholars mentioned such a conflict and tried to resolve it. The techniques used by scholars to resolve this conflict can be classified into three types:

1: Non-divine source for PM; the Prophet was using the Arabic traditional medicine of his time. 2: PM works only in the presence of internal faith in Allah that it will work (i.e., appeal to miracles). 3: The context of PM is limited to specific people, diseases, or situations (Takhsis Al Am).

Non-divine source for PM; the Prophet was using the Arabic traditional medicine of his time.

This technique was rarely used since it demolishes the concept of PM altogether. According to this secularizing technique, PM can simply be considered Arabic traditional medicine, and the Prophet used it without divine instruction, which means that it is vulnerable to error and can be corrected in the future if needed. The famous historian and Tunisian philosopher Ibn Khaldun was one of those who proposed this technique, arguing in The Muqaddimah: "*Civilized Bedouins have a kind of medicine that is mainly based upon individual experience. They inherit its use from the shaykhs and old women of the tribe. Some of it may occasionally be correct. However, it is not based upon any natural norm or upon any conformity [of the treatment] to the temper of the humors. Much of this sort of medicine existed among the Arabs. The medicine mentioned in religious tradition is of the Bedouin type. It is in no way part of the divine revelation. [Such medical matters] were merely part of Arab custom and happened to be mentioned in connection with the circumstances of the Prophet, like other things that were customary in his generation. They were not mentioned in order to imply that that particular way of practicing medicine is stipulated by the religious law. Muḥammad was sent to teach us the religious law. He was not sent to teach us medicine or any other ordinary matter*" (Ibn Khaldun,2004). However, although the Prophet used the medicine of his time, he used the best medicine available, and the mistakes—if any—that he made were very rare according to Al-Qadhi Ayad (Al-Asqlani,1961).

PM works only in the presence of internal faith in Allah that it will work (i.e., appeal to miracles).

This technique was often used and was considered the most spiritual technique, ignoring as it did the cause and effect relationship and calling for blind faith, in neglect of the laws of nature and human experience. The prophetic-miracle concept was used to resolve the conflict between PM and EBM. For example, Al-Qastallani, in defending the Hadith that supported the use of cold water to treat fever, said: "*if the hadith (i.e.*

use of cold water to treat fever) is authentic, it is not subject to medical rules; rather, it is subject to prophetic miracles" (Al-Qastallani,1921).

Another example is Al-Nawawi's discussion of the Hadith that called for the use of truffle water in treating eye diseases. In arguing with those who claimed that truffle water could cause blindness, he said: "*The right opinion is that truffle water is an absolute medicine… I saw a completely blind person who applied truffle water to his eyes recover his eyesight, and he used the water believing in its efficacy and seeking the blessing (Baraka) from it"* (Al-Nawawi,1969). The blessing (Baraka) is a kind of internal faith that this medicine will be beneficial since the Prophet used it and called for its use, a faith that means ignoring experimental medicine and relying on miracles. The concept of Baraka was used by Al-Khattabi when he defended the use of honey for diarrhea (Al-Khattabi,1988) and by Al Sarkhasi in defending the use of camel's urine to treat abdominal pain (Al-Sarkhasi,1993).

The context of PM is limited to specific people, diseases, or situations (Takhsis Al Am).

This intermediate technique was used by some scholars to reconcile the divine nature of PM with the fact that some people might apply PM without benefiting from it. They suggested that the context of the original PM Hadiths was essential, and if PM was not beneficial in more recent instances, this was because the original PM Hadiths were limited to specific people, diseases, times, or geographical locations. In Islamic jurisprudence, this technique of restricting the meaning of the whole to certain parts is called "Takhsis Al Am" (Al-Qarafi,1995). Applying this technique enabled the scholars to defend PM in all cases, even those in direct conflict with Greek or experimental medicine. The ready answer to any counterevidence or argument would be that PM was prescribed to specific people with specific conditions, and medical research should continue to endeavor to understand PM and unveil its context and range of validity (Ragab,2012). Therefore, PM is "*hidden knowledge [that] reveals itself in direct proportion to the scientific knowledge that develops independently…As knowledge and science expand and progress, our ability to understand the Prophetic traditions increases*" (Ragab,2012). Since it is always possible to blame any apparent failure of PM on its being applied out of context, this approach makes it impossible to refute or falsify PM.

An example of this technique is Ibn al-Qayyim's defense of the Hadith that recommended the use of the tail of a nomad's ewe for sciatica (Irq An-Nas): "*The Messenger of Allah, as we have noticed in previous Ahadeeth, may use two types of meanings in his expressions. One meaning may be general, for all conditions and people, while the other is specific, its meaning and indications being specifically directed at some particular people or situation. The Hadith in this section is the specific type; it is directed at Arabs and the people of Hijaz in particular, including the Bedouins of those areas*" Ibn al-Qayyim,1994). This technique was also used by Ibn-Alarabi to defend cupping therapy (Ibn-Alarabi,1997) and by Ibn Hajar when he explained the Hadith

that "*black seed is the cure for every disease except death*" by saying that black seed is a treatment for some diseases, not all (Al-Asqlani,1961).

Establishing an epistemological framework

Five epistemological frameworks (models) emerged from the integration of deductive or inductive reasoning with the techniques used by Islamic scholars to resolve the conflicts between PM and Greek medicine (Figure 3). Each model will be discussed separately in one of the next five subsections.

Model 1

In this model, all PM Hadiths are part of traditional Arabic medicine and have no divine source. Inductive reasoning can be applied in this model with no conflict. Medical researchers can conduct experiments and collect data to generate medical hypotheses. With sufficient repetition and sample size, hypotheses can be generalized and supported (Figure 3). Although this model is simple, practical, and logically consistent, a minority of scholars have adopted it, as previously explained.

Model 2

This model assumes that PM Hadiths have a divine source. If it also uses hypothetico-deductive reasoning (that is, the current medical application of deductive reasoning, not the Aristotelian syllogistic version), this model is self-contradictory. It simultaneously posits that PM is guaranteed to be factual because of its divine source and that PM is a theory, a mere likelihood, to be supported or refuted by the data that is subsequently collected. Most articles reviewed in the Mini review section used this model, since their authors first referred to the PM Hadiths as factual in their introductions, then collected data and reached conclusions in support of elements of PM (Figure 3).

Model 3

Like Model 2, this model assumes the divine origin of PM but adds that it is effective only for persons who have faith that PM is divine and beneficial. This model can be considered pseudoscientific since it goes against the very definition of current science, which relies on cause-effect relationships verified through observations and experiments. Using inductive reasoning in this model is meaningless since faith in God cannot be observed or subjected to experiments (Figure 3).

Model 4

This model relies on the idea that PM is limited to specific categories of people, diseases, or situations throughout all time. This model simultaneously assumes that PM is of divine origin and that PM accords with cause and effect relationships. Using inductive reasoning to collect data in this model threatens to contradict the divinity of PM's source if the data shows any cases in which PM fails. Although this model claims that PM is only beneficial in certain cases, these cases are unknown. If the

scholars specify particular groups of people, diseases, places, or situations as the ones to which PM applies, examining the effect of PM on those groups by inductive reasoning from empirical evidence runs the risk of contradicting the divinity of PM if it fails to show a beneficial effect (Figure 3).

Model 5

Like Model 4, this model claims that PM is divine and limited to certain cases, but unlike Model 4, in this model PM is limited to the individuals to whom the Prophet made the prescriptions. This technique to resolve the conflict between PM and Greek medicine or EBM was not mentioned by Islamic scholars. Rather, it is proposed here to preserve the divinity of PM and to help set aside any potential future conflict with EBM. In this model, the PM Hadiths can be a beneficial source of information, but any applications of PM in the present time should be validated using EBM. If EBM shows that PM has no benefits in the present time, this will not contradict the divinity of PM's source since PM was prescribed only for single cases that existed only at the time of the Prophet (Figure 3).

The most appropriate model

As discussed in the previous subsections, Models 1 and 5 are best aligned with the scientific method and current EBM. Although Model 1, which affirms a non-divine source for PM, was suggested by Ibn Khaldun about six hundred years ago (Ibn Khaldun,2004), respect for the holiness of the prophet's Hadiths among Muslim scholars prevented this opinion from spreading (Robbi,2018). The scholars argued that if the Hadiths concerned with Prophetic medicine cease to be regarded as holy on the grounds that the Prophet's medical actions were limited to the traditions of the Arabs of his time, then this interpretation will extend to other Hadiths in the fields of economics, politics, and so forth. Consequently, this approach will lead—in their view—to the secularization of Islam and the limitation of the Prophet's role to metaphysical issues (Robbi,2018). Furthermore, they argued that granting that the Prophet may make mistakes in medicine contradicts the Qur'an's statement that the Prophet does not utter his own opinions but rather says what God has revealed to him (Ibn al-Qayyim,1994). Therefore, Model 5 may represent a more acceptable approach for these scholars. Model 5 preserves regard for the holiness of the Prophet's Hadiths and the tenet that the Prophet did not speak except by revelation, and at the same time, this Model limits the Prophet's medical Hadiths to his time with the understanding that he chose the best medicine available then and that if the elements of modern medicine had been available to him, he would not have hesitated to adopt them. Thus, the benefit and sanctity of the Prophet's medical Hadiths are limited to the people to whom the Prophet prescribed these medicines and do not extend to those after them. However, this does not prevent current medical researchers from benefiting from these medicines by testing their current validity. Model 5 thus closes the door to futile or self-contradictory attempts to reconcile PM with EBM and opens the door to scientific progress in medicine without hindrance.

There is no study without shortcomings, and one shortcoming of this study is that the mini-review used only two databases, namely Google Scholar and PubMed, which may have reduced the number of resulting studies. However, since the review was exploratory in nature, there was no need to search all available databases. Also among the shortcomings is that the books of Hadiths and commentaries used in the second part of the study were limited to the Sunni doctrine in Islam, omitting the Shiite sect and other schools of thought. Because the Sunni doctrine is the most prevalent in the Islamic world (Fuchs,2017), this approach was considered adequate for this study.

Conclusion

This study has aimed to build an epistemological framework that can resolve the conflict between PM and present-day EBM. To that end, a mini-review was conducted to investigate the epistemological frameworks used in PM medical articles. The mini-review found that almost all PM articles were conducted in Islamic countries with possible publication bias toward positive findings. The majority of the studies reviewed misused hypothetico-deductive reasoning by citing the PM Hadiths in the introduction as factual and then confirming their validity using the tools of EBM. The second part of the study was a textual analysis carried out to identify PM Hadiths recounted in Islamic Hadith collections and scholars' commentaries and to describe how Islamic scholars resolved the conflicts between PM accounts and Greek medicine. Finally, epistemological frameworks (models) were constructed, and one of them was chosen as the most appropriate for resolving conflicts between PM and EBM. It may be appropriate to conduct further studies to discover how scholars of other Islamic schools (other than Sunni school of thought) have dealt with PM. It is also appropriate that the epistemological frameworks proposed in this study be used in the studies of PM in the future in order to test their quality, validity and acceptance among researchers.

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Figures, Tables

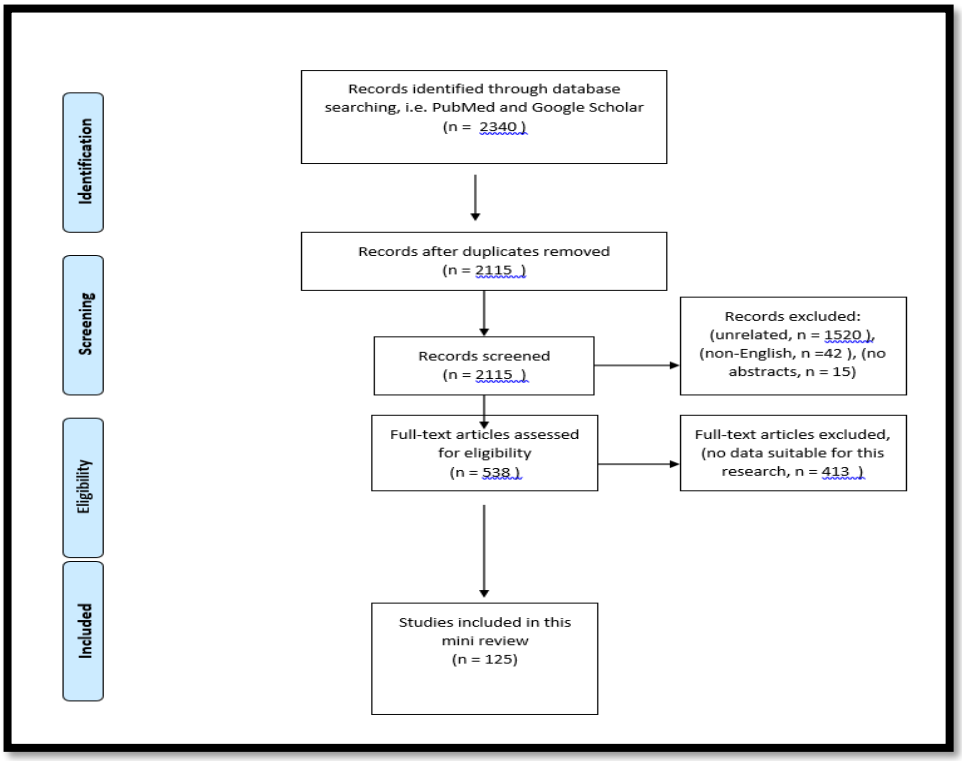

Figure 1. PRISMA flow chart of included studies

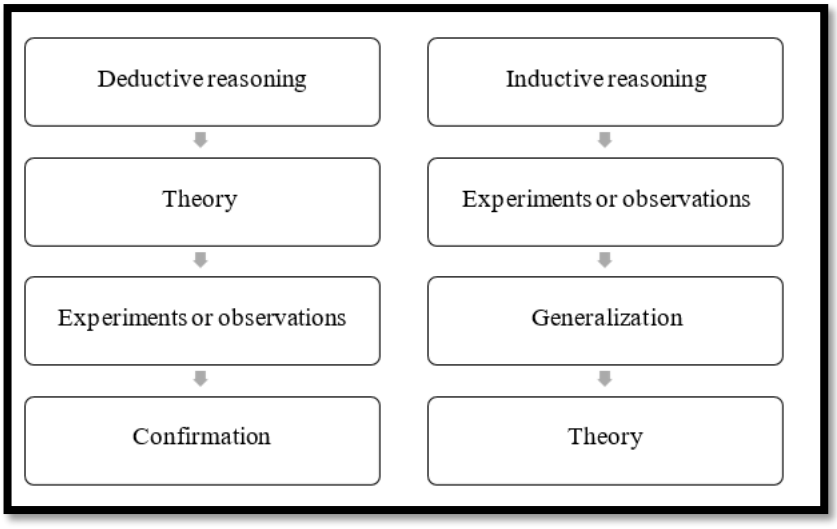

Figure 2. Conceptualizing inductive and deductive reasoning

Hadith collection	Commentaries (Shruh) books
Sahih al-Bukhari	Fath ul-Bari fi Sharh Sahih al-Bukhari by IbnHajar Al-asqlani Irshad al-Sari li Sharh Sahih al-Bukhari by al-Qastallani Al-Kawkab al-Darari fi Sharh Al-Bukhari by al-Kirmani The A 'lām al-fiadīth of al-Khaṭṭābī: ACommentary on al-Bukhārī's Safiīfi Kashf al-mushkil li-Ibn al-Jawzī ʻalá Ṣafiīfi al-Bukhārī
Sahih Muslim	Al Minhaj Be Sharh Sahih Muslim by Al-Nawawi Al-Mufhim Sharh Sahih Muslim By Al-Qurtubi Al-Mualim Sharh Sahih Muslim By Al-mazri
Jami al-Tirmidhi	Aridhat al-Ahwathi bi Sharh Sunan al-Tirmidhiwritten Ibn al-Arabi Tuhfat Al-Ahwadhi Bi Sharh Jamiʻ Al-Tirmidhiby 'Abd al-Rahman al-Mubarkafuri
Sunan Abu Dawood	Tahdhib Sunan Abi Dawud - Ibn al-Qayyim al-Jawziyyah Awn al-Ma'bood by Shams ul-Haqq Azimabadi
Sunan an-Nasa'i	The Ḥāshiyah of»AlḤāfiẓ Al-Suyūṭī The Ḥāshiyah of ʻAllāmah Sindī Dhakhīrat al-ʻUqbā fī Sharfi al-Mujtabā, by Shaykh Mufiammad ibn ʻAlī ibn Ādam al-Ityūbī
Sunan ibn Majah	The Ḥāshiyah of ʻAllāmah Sindī
Other books	At-Tamhid (sharh al-Muwatta) by Imam ibnAbdil-Barr Al-Istidhkâr by Imam ibn Abdil-Barr Zad al-Ma'ad by Ibn al-Qayyim al-Jawziyyah At-Tibb al-nabawi by Al-dhahabi Al-ihkam fi tamyiz al-fatawa an al-ahkam watasarrufat al-qadi wal-imam by Shihab al-Dinal-Qarafi Irshad Al-khalq by Mahmood Al-subki Al Mabsut By Imam Abi Bakr Al Sarkhasi Faid al-Qadir by Muhammad Abdur-Rauf al-Manawi The Muqaddimah by Ibn Khaldun

Table 1. Hadiths collections used to identify the PM Hadiths in this study.

Variable	Total number	Percentage
Article type		
Review	61	48.8
Tissue or cells experiments	27	21.6
Animal experiments	17	13.6
Clinical trials (no phase mentioned)	16	12.8
Case report	2	1.6
Systematic review	2	1.6
The country where the study was conducted		
Saudi Arabia	52	41.6
India	21	16.8

Egypt	12	9.6
Pakistan	9	7.2
Other	31	24.8
The country where the journal was published		
India	40	32
Saudi Arabia	14	11.2
United kingdom	14	11.2
United Status	12	9.6
Other	45	36
Funding source		
King Abdulaziz University (Saudi Arabia)	17	13.6
Taibah University (Saudi Arabia)	15	12
Qassim University (Saudi Arabia)	5	4
Taif University (Saudi Arabia)	5	4
Other	83	66.4
Where the "Prophet medicine" was mentioned in the article		
Introduction	116	92.8
Discussion	8	6.4
Results	1	0.8
Treatment		
Black seed (alone or with other ingredients)	67	53.6
Cupping (Alhijama)	24	19.2
Lawsonia inermis (Henna)	8	6.4
Phoenix dactylifera (Ajwa date)	7	5.6
Costus	5	4
Other	14	11.2
Is the treatment beneficial		
Yes	123	98.4
No	2	1.6

Table 2. Characteristics of the PM studies

Phyto Antitussive Medicines Affect the Cough Treatment for Covid-19's Children's Patients

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Abstract

Cough was one of the most troubling symptoms for Covid-19 s patients treated at home. Pandemic years of Covid-19 brought a novel approach to the use of medicinal plants. Cough is not only distressing to patients, but also increases the risk of community transmission by respiratory droplets. Stigmatization of patients with cough can occur, leading to social isolation, particularly during the infections with covid-19. Identifying ways to control Covid -19-associated cough could help to prevent community transmission and disease spread, as well as removing the stigma of this symptom. The aim of our survey was to know the cough treatments with Covid-19 children patients treated home with simple and moderate symptoms. The behaviors of pharmacist and doctors' community for treating these symptoms with Phyto preparations. This is a survey study conducted in open big ten network pharmacy of Tirana and to the 3 main ambulatory clinics of during of Tirana during the pandemic year 2021 for the period October -December 2021. We collected information concerning the use of antitussive medicine s in this period from a questionnaire distributed to pharmacist and doctors which consisting open and closed questions. The biostatistical expert suggested to includes a combination of original question containing both the qualitative and quantitative data to the questionnaire. Data received from the questionnaire had two type of questions 1) multiple choice and 2) open questions. Results shown that antitussive medicinal plants were preferred compare with other alternatives. Mostly of the patients used in the wrong way in terms of frequency and durations. From the total 240 patients only 195 (81.25%) has given corrects to the pharmacists or have completed all the questions. From all the plants althea officinalis was the most used with 66% followed, by thymes vulgaris 29% the rest where different medicinal plants. In conclusions is necessary knowledge to orients pediatrician for the right use of Phyto medicine. Plants Althea officinalis, Thymus Vulgaris can demonstrate the same efficacy compare with synthetic antitussive medicine, but less side effects. They must be well known through educations program. Side effects of medicinal Herbs are lower, and they may be used with their proper efficacy that they have and can use longer than synthetic ones.

Keywords: Dry Cough, Antitussive Plant, Symptoms, Efficacy, Safety

Introduction

COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has influenced global health since its discovery in Wuhan, China. Cough is one of the most common presenting symptoms of COVID-19, along with fever and loss of taste and smell. Cough can persist for weeks or months after SARS-CoV-2 infection the post-COVID syndrome or long COVID [Guan WJ,2019, Grant MC, 2020, Canning BJ, 2020]. The pathways of neurotropism, neuroinflammation, and neuroimmunomodulation through the vagal sensory nerves, which are implicated in SARS-CoV-2 infection, lead to a cough hypersensitivity state. The post-COVID syndrome might also result from neuroinflammatory. The mechanisms of acute and chronic COVID-19-associated cough and post-COVID syndrome, consider potential ways to reduce the effect of COVID-19 by controlling cough, and suggest future directions for research and clinical practice.

Cough is not only distressing to patients, but also increases the risk of community transmission by respiratory droplets. Stigmatization of patients with cough can occur, leading to social isolation, particularly during the COVID-19 pandemic. Identifying ways to control COVID-19-associated cough could help to prevent community transmission and disease spread, as well as removing the stigma of this symptom[Goërtz YMJ. 2020, BHP, 1996, EurPharmac. 1996]

Radix Althaea consists of the dried roots of Althaea officinalis L. (Malvaceae) used for pharmacological effects . The major chemical constituents of mucilage content ranges from 10 to 20% a mixture of acidic galacturonorhamnans, neutral glucans and neutral arabinogalactans In pharmacopeias and in traditions systems is consider a as a demulcent for symptomatic treatment of dry irritable coughs and irritations of oral and pharyngeal mucosa and other indications. Also it is used in cough mix. In pharmacology the demulcent effects of Radix Althaea are due to its high content of polysaccharide [EuePharmac, 1996, Farmacopea Polska V, 1995] hydrocolloids, which form a protective coating on the oral and pharyngeal mucosa, soothing local irritation and inflammation (Althea officinalis has an Anti-inflammatory activity thanks to A polysaccharide fraction (500mg/ml) isolated from a root extract had anticomplement activity in human serum in vitro Aqueous extracts of the roots stimulated phagocytosis, and the release of oxygen radicals and leukotrienes from human neutrophils in vitro The aqueous extract also induced the release of cytokines, interleukin-6 and tumor necrosis factor from human monocytes in vitro, thereby exhibiting anti-inflammatory and immunostimulant activity [Farmacopea Polska V, 1995]

Materials and Methods

Study design, participants. The study was based on a survey in Pharmacies of Tirana in post covid -10 patients suffering the symptoms of Covid -19's children patients treated at home. This is a retrospective study conducted in open 10 network pharmacy of Tirana during the pandemic year 2021. We collected information concerning the use of antitussive medicines in this period from a questionnaire distributed to pharmacist which consisting in ten questions dedicated for pediatric uses as antitussive medicine from herbal and synthetic ones We assessed ten pharmacies. the study population comprised pharmacist completing a 15-minute paper -based survey with a minimum 10 individuals per week for the Period October-December 2021 (12 weeks), in total 240 individuals. This study includes individuals following inclusion and exclusion criteria

Inclusion criteria

Cough dry with Covid -19's children's patients up to 14 years old

Cough dry treatments with Covid -19 children's patients with simple and moderate symptoms

Exclusion criteria

Patients that dismiss the treatment

Patients that did not reach adherence

2.1 Survey questionnaire

The participating pharmacist must complete the questionnaire We assessed ten pharmacies. the study population comprised pharmacist completing a 15-minute paper -based survey with a minimum ten individuals per week for the Period March-June 2021 (12 weeks), in total 240 individuals.

The questionnaire includes a combination of original question containing both the qualitative and quantitative data. The questionnaire was controlled by the biostatistical expert which recommend us to make two type of questions 1) multiple choice and 2) open questions.

From the total 240 individuals (parents) only 195 (81.25%) has complete the questionnaire in all questions and in time. The questionnaires were distributed by hand and received the feedback the day after. English version is written below

Questionnaire

Question 1: Gender

Question 2: Age

Question 3: Is dry cough your most disturbing symptom?

Question 4: What medications are you taking at the same time?

Question 5: Do you use herbal medicines for cough or what doctor has described?

Question 6: Do you prefer herbal or synthetic medicines for cough (OTC)?

Question 7: Which of the following medicinal herbs would you choose for your cough?

Salvia Officinalis

Laurus Nobilis

Althaea Officinalis

Plantago

Thymus Vulgaris

Question 8: Have you heard of profit or side effects of medicinal plants?

Question 9 Why you prefer herbal medicine for cough?

Question 10: Do you agree do give this medicinal herb tea for all individuals not only for children

Statistical analyses were done with SPSS 25. Descriptive statistic and frequency were two variables. Description questions were used for qualitative data. Closed questions are considering a simple descriptive statistic included frequency and distributions.

Results and Discussion

From the total 240 patients only 195 (81.25%) has complete the questionnaire. Participants has completed all the question despite been correct or not. Our participants in total were 195 were 125 were females (64%) and 70 were male (36%). The data shown in Table 1.

Table 1. Baseline characteristics

	Number	%
Gender		
Male	70	36 %
Female	125	64%
Covid-19 status		
Post Covid -19 patients cough continue	136	69.49 %
Covid patients treated home	60	30.51 %
Age		
1-5 years	78	39.74%
5-10 years	37	18.67%
10-14 years	81	41.59%

All the participants (100%) have dry cough symptoms, where 82% dry cough and 8% wet cough 10% mix cough. Their cough was caused SARS COV-2 and 68% were post Covid-19 status. Their dry cough is over 2 weeks and they have been treated earlier with the other drug. All agreed to take the Phyto medicine for caught treatment. Children 's parents accepted herbal treatments as well old patients. The results were 57.55% considered successful while 42.45% have continued the co-treatment with another medicine. All patients accepted the use of medicinal herbs for pediatric and elderly age groups, with younger ones being skeptical of their effectiveness. Only 2.45% of them admitted that medicinal herbs had side effects, while all the others admitted only their effectiveness. From all the medicinal plants althea officinalis was the most used with 66% followed, by thymes vulgaris 29% the rest where different medicinal plants .

Althaea officinalis L. (Malvaceae) is an indigenous to western Asia and Europe medicinal plant . Major chemical constituents of Radix Althea content ranges from 10 to 20% and consists of a mixture of acidic galacturonorhamnans, neutral glucans and neutral arabinogalactans . R. Althea is used as a demulcent for symptomatic treatment of dry irritable coughs and irritations of oral and pharyngeal mucosa . The demulcent effects of Radix Althaea are due to its high content of polysaccharide hydrocolloids, which form a protective coating on the oral and pharyngeal mucosa, soothing local irritation, and inflammation.

Antitussive activity is knows for R. Althea, when intragastric administration of a polysaccharide fraction, isolated from an aqueous root extract suppressed the intensity and the frequency of coughs induced by mechanical irritation of laryngopharyngeal and tracheobronchial mucosa The antitussive activity of this

polysaccharide fraction (50 mg/kg body weight) was as effective as Syrupus

Althaeae (1.0g/kg body weight), and more effective than prenoxdiazine (30 mg/kg body weight) (Nosal'ova G, 1992).

Althea officinalis cause a weak inhibition of mucociliary transport in isolated, ciliated epithelium of the frog esophagus was demonstrated after treatment of the isolated tissues with 200 ml of an aqueous root macerate (6.4 g/140 ml) . There have been great advances in our understanding of the pathways underlying cough and cough hypersensitivity [WHO monographs, 2006]. Cough is a reflex that requires minimum conscious control, occurring through the activation of peripheral sensory nerves into the vague nerves, which provide input to the brainstem at the solitary nucleus and the spinal trigeminal nucleus [Trease and Evans, 2009, WHO, 1998, WHO,1997]. The neurotropism of SARS-CoV-2 could explain the other accompanying symptoms of COVID-19 and post-COVID syndrome[Dhand R, 2020, Bisset NG, 2019, Menni C, 2020]

Conclusions

The uses for a long time for treating dry cough caused by Covid -19 children patients results more beneficial compare to other synthetic medicine for cough treatment. The population by the traditional is oriented more and more to medicinal plant, but the all the providers have to trust more and more.

It is necessary knowledge to orients individuals for the right use of medicinal herbal with antitussive effect that Althea Officinalis can demonstrate especially when they are for use for a long period of time.

Recommendations

Treating the acute and chronic cough of COVID-19 is based on available treatments and guidelines, but intensification on using medicinal plants can give more benefits and less side effect.

The educations program for developing knowledge on medicinal plant and for dry cough treatments need to be more and more efficient.

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Challenges of Nursing Students in Relation to Academic Performance at the Faculty of Technical Medical Sciences

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Abstract

Nursing students face various challenges during their years of study, which may hinder their academic performance. The success of nursing students is particularly important given that they must provide quality care to patients, family members and the community. Academic performance in nursing programs includes advances in theoretical subjects and the acquisition of practical skills in the clinic. A series of studies have shown that during the years of study, nursing students face many difficulties that affect their learning skills and consequently their academic performance. This study aims to identify and describe the difficulties experienced by nursing students of the Faculty of Technical Medical Sciences of Tirana in relation to academic performance. This goal was achieved by using a qualitative research method, such as focus group discussion. Data were collected through discussion with 51 Bachelor students, 17 of whom in the first year, 15 in the second year and 19 participants in the third year. For each year of the study 2 semi-structured discussions were held and the data were analyzed through thematic analysis. The findings of this study found that nursing students face these difficulties: Low level of students engagement in clinical practice; Low number of nursing courses; Passive teaching methods; Unfair and non-transparent evaluation; Large number of exams per season; Insufficient time to prepare for the season; Employment and finances; Physical environment in the faculty and public transport. Heads of Departments and Faculty can use the findings of this study to provide the necessary support that nursing students seek in reducing the difficulties they face in order to enhance their academic performance.

Keywords: challenges, nursing students, academic performance

Introduction

Nursing students face various challenges during their years of study, which may hinder their academic performance. The success of nursing students is particularly important given that they must provide quality care to patients, family members and the community (Ratanasiripong et al. 2021). Academic performance in nursing programs includes advances in theoretical subjects and the acquisition of practical skills in the clinic. A series of studies have shown that during the years of study nursing students face many difficulties that affect their learning skills and consequently, their academic performance.

Dante et al. (2013) in a systematic review of the literature regarding academic performance indicators confirmed the complex nature of academic performance for nursing students, arguing that the influencing factors for one student may be very different for another. While Mthimunye & Daniels concluded that nursing students face difficulties such as: part-time employment, off-campus stay, curriculum structure, insufficient academic and clinical support, and unfavorable physical faculty environment (Mthimunye & Daniels 2020). Previous studies have shown that during the years of study, nursing students face many difficulties that affect their learning skills and consequently, their academic performance. By identifying and recognizing the difficulties encountered by students during their years of study, measures can be taken to reduce barriers and improve academic performance (Fooladi et al. 2022).

This study was based on the conceptual model of reducing the gap towards student success, by Perna & Thomas (2006). These challenges can be the result of the interaction of personal, family, school as well as social, economic, and political context (Perna & Thomas, 2006).

This study aims to explore and describe the challenges experienced by nursing students of the Faculty of Technical Medical Sciences (FTMS) of Tirana in relation to their academic performance.

Methodology

This study used a qualitative research approach, such as focus group discussion, to identify difficulties encountered by students in relation to their academic performance. The study was conducted at the Faculty of Technical Medical Sciences (University of Medicine of Tirana, Albania), which prepares nurses in accordance with the Bologna system, Bachelor 3 years and Professional Master one year and Master of Science two years. Qualitative research seeks to provide a detailed explanation of human attitudes, feelings, and perceptions (Tong et al., 2012). This method was useful in this study to explore the difficulties faced by nursing students.

The sample consisted of 51 Bachelor students, who were randomly selected using the name lists of each year of study. Participants were informed that the principle of confidentiality and anonymity would be respected and their involvement in the study was voluntary. During the selection of the sample not all students agreed to

participate. 17 participants from the first year, 15 participants from the second year and 19 participants from the third year took part in the research.

Prior to data collection, a pre-test was performed with 4 students, to improve validity in qualitative data collection procedures and interpretation of findings (Brown, Lindenberger, & Bryant, 2008).

Two focus group discussions took place with each study year in the period January-March 2022, and each discussion lasted about 50 minutes. All six focus group discussions took place in a FTMS meeting room.

Focus group discussion is a technique where the researcher discusses with a group of individuals a specific issue, aiming to extract from the complex personal experiences, beliefs, perceptions, and attitudes of the participants through a moderate interaction (Hayward, Simpson, & Wood, 2004).

Data were collected with the help of study assistants. The lead researcher together with colleagues supervised the process and the quality of the collected data. The following questions were asked to obtain the required data on the difficulties faced by nursing students regarding academic performance:

-Describe the difficulties that have affected your academic performance encountered in the faculty settings.

-Describe the difficulties that have affected your academic performance encountered in clinical settings.

-What efforts have you made to ensure satisfactory academic performance and achievement?

-What do you think needs to be improved regarding overcoming difficulties that affect your academic performance?

Other investigative questions were used during the discussions to further delve into the problems students encountered during their years of study. The discussion took place in Albanian language, and it was recorded with the permission of the participants by using a recorder. Study assistants kept brief notes about each participant's comments that answered the semi-structured and open-ended questions. Qualitative research and especially focus group interviews generate large amounts of data. Yin (1989) states that data analysis consists of a series of stages such as examination, categorization, and tabulation or recombination of evidence, to address the initial purpose of the study. Data analysis was based on transcribing focus groups, identifying key topics, organizing data, interpreting topics and ideas, and reporting.

Findings

Data analysis generated 194 citations, which were categorized into 3 topics and 11 categories. The categorization of the data and the clarification of the topics was based on the model adapted by Perna and Thomas (2006).

Topic 1 School context

Category 1 Low level of student engagement in clinical practice

Bachelor's nursing students admitted that they were not properly supported by the clinical supervisors employed by the faculty to oversee the students at the clinical premises. In the discussions that took place, most of the second- and third-year students stated that the difficulties they encountered in the clinical environment negatively affected their academic performance. The students admitted that the practice hours are insufficient for them, which affects their practical training. The students stated that:

"… *The problem for us is the practice of doing more theoretical and less practical training, for our profession we need the opposite." (FGD 5, BN 3)*

"The supervisors do not engage us during the internship, they do not know us, and the evaluation is unfair." (FGD 3, BN 2)

"*In some hospital wards we are told to sit in a corner of the ward because we hinder them… we do not learn anything; we do not see anything from the procedures that are performed there."* (FGD 4, BN 2)

"Nursing practices should be taken seriously by the staff receiving us at the hospital. I have encountered very unsatisfactory behavior by the staff where we have the practical training, arrogant and not helpful at all." (FGD 6, BN 3)

"*We are large groups, and we cannot even learn the basics."* (FGD 5, BN 3)

Category 2 Curriculum structure

This discussion highlights the challenges directly related to the curriculum experienced by students. They say they have a large number of subjects and exams, and some subjects (in their judgment) are unnecessary for the nursing branch. They declare:

"I think we have many subjects and exams, different from other faculties; some of these subjects seem unnecessary to me." (FGD 3, BN 2)

"Some subjects should not be included in curriculum, because they are not related to the nursing branch, and unimportant subjects should have less credits." (FGD 6, BN 3)

"The curriculum has a big volume and a lot of subjects, there are also subjects with one credit." (FGD 5, BN 3)

"The literature and program need to be clearer and more concrete at to what we need as nurses." (FGD 6, BN 3)

Category 3 Educational workload

The transition from high school to university confronts first-year students with the burden and volume of lectures that make it difficult for them to understand and learn. First year students suggest that it is more effective for them to develop laboratory practice in smaller groups and that the large number of subjects is a barrier to learning. Some of the students' sayings are:

"I had difficulties at the beginning of the academic year with the adjustment regarding the volume of material received to find the right method of study and to manage time." (FGD 5, BN 3)

"The lectures seem very long to me compared to high school and it is difficult to learn." (FGD 2, BN 1)

"Anatomy is very difficult, we should go in smaller groups to the laboratory to learn." (FGD 1, BN 1)

Category 4 Organizing the exam season and scheduling

Students state that the exam season is short and insufficient to prepare for a large number of subjects. They say:

"We have a very large number of exams and the time between exams is very short, which we find impossible to cope with and very stressful." (FGD 3, BN 2)

"The time to prepare for the exam is very short ... we have to take an exam every day and we cannot manage to repeat what we have learn before and it is impossible to learn for the exam during the exam season." (FGD 5, BN 3)

"The schedule and order of subjects should be reviewd, for example: we should learn Latin before anatomy to become familiar with Latin terms." (FGD 2, BN 1)

"Lectures should have seminars between them, not only lectures in a row and seminars at the end; their combination will be more effective." (FGD 6, BN 3)

Category 5 Teaching methods

Students say that some of the professors do not use interactive methods during the lessons, which leaves the student passive only by listening and does not help them in acquiring knowledge, resulting in loss of interest. Some of their statements are:

"I lose interest when certain professors start reading the material on the laptop without giving concrete examples to make it more attractive, this is a matter of concern not only to me, but also to my friends." (FGD 1, BN 1)

"Lecturers should develop the lesson more as a conversation… we listen to the lecturer for 2 or 3 hours. I think they should concretize the subject with concrete examples from real life. " (FGD 2, BN 1)

"Some lecturers only read the slides and do not explain to concretize what they say." (FGD 5, BN 3)

Category 6 Student Assessment

Regarding the assessment of knowledge by lecturers, students say that they face many difficulties and lack of transparency, which has reduced their motivation. Some of them say that the evaluation is not based on the merit of everyone.

"When I complained about the grade because I rightly deserved more, the professor, pressuring me, said that he could lower my grade even more." (FGD 5, BN 3)

"What has influenced me is the fact that you work, study, get tired and in the end, you are evaluated less than you deserve… because there is a prejudice that not all students in a class could get grade 9 or 10." (FGD 3, BN 2)

"… Our answers in seminars and course assignments are not considered in the final evaluation." (FGD 4, BN 2

"We are evaluated unfairly in exams, and we are not given the opportunity to see the exam thesis." (FGD 6, BN 3)

Category 7 Physical facilities of the faculty

Another concern mentioned by the students were the conditions at the faculty. They say that they did not have the minimum conditions such as. heating, elevator etc.

"Conditions are not good in the faculty, during the winter we did not have heating… only the boiler was not enough, the toilets do not even have the minimum hygiene." (FGD 4, BN 2)

"We are on the fifth floor, and we lack the elevator, heating, reel, etc." (FGD 6, BN 3)

Topic 2 Socio-economic and political context

Category 1 Economic situation

Some students said that they face financial difficulties that force them to work during their studies. They show that the school fee and the prices of rented houses are very expensive. According to students:

"School fees are expensive compared to salaries in Albania." (FGD 4, BN 2)

"Living is very expensive and I have to work… after school I have to go to work and come back in the evening… and I prepare only 1 or 2 days before the exam, which is not enough, but I am obliged." (FGD 2, BN 1)

"My economic situation is not so good... school fees, books, transportation, living expenses have been high and have affected the psychological side, there have even been cases of depression. "I have been forced to work and I have little time to study." (FGD 5, BN 3)

Category 2 Transportation

Despite of reduced transportation fares for students, urban transportation remains a concern for them. According to students:

"One of the most negative experiences for me has been transport, as I live in the area of Astir and it is far; I cannot reach the faculty to attend the first hour due to traffic." (FGD 3, BN 2)

"For me, the distance from the family, the transport that costs and takes a long time due to traffic are obstacles for the results." (FGD 1, BN 1)

Topic 3 Personal context

Category 1 Student Efforts

One of the basic factors of academic performance is the efforts of the students themselves. During the study period the priority of students is learning to successfully complete university. Students have given due importance to some of the factors such as time planning, systematic study, utilization of other resources to meet the needs of learning such as the Internet and health institutions. They claim that:

"*I have prepared regularly by learning every lesson despite the fact that it was not worth, because I got lower grades than the other students, who cheated at the exam".* (FGD 3, BN 2)

"I asked for my right regarding the grade I did not deserve... plus I read every day to have good results" (FGD 2, BN 1)

"I have devoted a lot of time to lessons, I have done volunteer work in various hospitals and clinics" (FGD 4, BN 2)

"I have tried to find methods with illustrations for example: in anatomy to learn about bones, with video on YouTube for physiology and I read every day." (FGD 5, BN 3)

"During the lecture I try to keep notes to make it easier." (FGD 6, BN 3)

Category 2 Student suggestions for improving the situation

Students think that curricula and educational load should be improved; more attention should be paid to clinical practice, students should be motivated, teaching should be improved. They identify and suggest:

"The exams we take in the season (at the end of the semester) should be reduced because they are too many." (FGD 3, BN 2)

"Lecturers need to evaluate fairly, and improve teaching." (FGD 4, BN 2)

"Lecturers should be more transparent with the student and create opportunities to develop more regular practices." FGD 6, BN 3

"Reduce the number of not very important subjects, pay attention to practice, the explanation should be more complete." (FGD 5, BN 3)

Discussion

This study found that the difficulties faced by nursing students at FTMS of Tirana in relation to academic performance are as follows: low level of student engagement in clinical practice, large number of courses and exams, insufficient time to prepare for the season, low number of nursing courses, passive teaching methods, unfair and non-transparent assessment, employment and finances, faculty physical facilities and public transport.

Nursing students do not receive adequate clinical support at the facilities of University of Medicine from internship mentors. According to (Baraz et. al. 2015), the clinical learning experience is at the heart of nursing education and also in a study by (Papastavrou et al. 2016), the quality of nursing education depends largely on the quality of clinical experience. Students suggest that more needs to be done in regulating internships performed in hospitals, they seek a more supportive and hospitable learning environment. During clinical practice, students often face challenges, which make them feel vulnerable (Chan 2001); this requires the serious commitment of the faculty to facilitate the practice and create a supportive environment for students. Other studies have argued that instructor incompetence, negative attitudes, and poor student support can cause adverse effects on student academic performance. (Anthony 2011; Sharif 2005).

In the discussions that took place, the second- and third-year students stated that the difficulties they encountered in the clinical environment negatively affected their academic performance. Another learning challenge from the perspective of most of nursing students, who participated in this study, was the lack of reliability of clinical evaluation. This is because these assessments were not able to properly assess students' scientific knowledge, practical skills, and professional conduct. This result is consistent with the results of the study of Bourbonnais et al. (2008). The relationship between faculty and student is an important part of student success during clinical practice (Foreman et al. 2016). The environment where students study and practice include important aspects such as social climate, care activities, communication, and interpersonal relationships as well as reflection (Kamphinda & Chilemba, 2019).

According to the students, the lecturer-student communication and cooperation is not at the right level and that this leads to an increase in their distrust regarding the veracity of the professional evaluation and judgment. A considerable number of the students express their concern about the assessment, the transparency of the lecturer

regarding the assessments and it often seems that the grade is a "strong weapon" in the hands of the lecturer.

In a study in Iran, Cheraghi came to the conclusion that during the learning process regarding the acquisition of knowledge, there was not much attention to students and aspects of learning (Cheragi et al. 2007).

Assessment methods can have their share of negative impact on quality student performance as they often result in a large amount of stress (Wang and Yeh, 2005).

Both Boulton and O'Connell (2017) noted that the amount and difficulty of learning material in the nursing program is a common stress for nursing students.

Jeffreys (2012) discussed study skills as an important factor influencing academic performance. He noted that reading skills, note-taking should also be accompanied by attitudes of accepting responsibility for study, activities such as self-direction, willingness to adapt and detailed plans.

The internal context of the students is related to the approaches, the student's behavior in relation to the chosen vocational education. They claim that they seek higher results, try to learn more by using all possible resources (internet, additional literature) to supplement their knowledge in the field of nursing. They have organized the day; they have chosen to attend classes regularly and some even admit that they learn in groups to improve academic performance.

Employment and finance have a major impact on students' academic experience, according to the UCE Center for Quality Research (CRQ). This study found that students are under pressure to afford living, the cost of renting housing, paying for public transportation, educational materials, and are forced to work part-time by not devoting enough time to lessons. In the National Student Engagement Survey (NSSE) in 2012, students were asked how finances affected their academic performance. The results showed that 60% of students said this interfered with their performance negatively. This proves that work and financial worries lead to fatigue and lack of concentration which endanger the performance of students in universities (Al-Muslimawi & Hamid 2019).

Conclusions and recommendations

The purpose of this study was to explore and describe the challenges experienced by nursing students of FTMS of Tirana in relation to academic performance. Low level of students engagement in clinical practice, large number of exams, insufficient time to prepare for the season, low number of nursing courses, passive teaching methods, unfair and non-transparent evaluation, employment and finances, physical facilities of the faculty and public transport are some of the difficulties encountered by FTMS nursing students in relation to academic performance. These findings indicate that measures should be taken to help students cope with difficulties that hinder their academic performance. Heads of Departments and Faculty can use the findings of this

study to provide the necessary support that nursing students seek in reducing the difficulties they face to enhance their academic performance.

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Correlation of Society Stringency/Openness Measures with Timely Trend of COVID-19 Cases - Case Study – Albania Versus Italy

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Abstract

Following the WHO[1] declaration for COVID-19 as a pandemic, this disease has caused an international crisis with a severe impact on economic and health care systems. After the first cases reported in China, the disease has progressively widespread worldwide where all affected countries has adapted specific safety protocols and tried to find new therapies in order to face this new disease. The final objective is to evaluate the overall impact of stringency measures taken from Albanian and Italian governmental authorities in relation to daily cases of COVID-19 in each country. This is a descriptive paper where the data collected in Albania and Italy according to authority-based stringency measures were compared with their output; temporary trend of daily cases. Officially Albania reported the first COVID-19 case in 8th of March[2] in an Albanian citizen just arrived from Italy, meanwhile in Italy the first cases dated January 31st were a Chinese couple in Rome who had travel from Wuhan City[3]. Both governments took action by applying different closer measures; thereby Blavatnik School of Government has introduced the Oxford COVID-19 Government Response Tracker (OxCGRT)[4] in order to quantifying numerically these actions. According to OxCGRT, Albania and Italy present similar level of stringency indicator, but epidemiological curve of daily cases is totally different in shape. Italian curve

[1] WHO. Statement on the second meeting of the International Health Regulations (2005). Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov). Jan 30, 2020

[2] WHO. Novel Coronavirus(2019-nCoV) Situation Report – 11, 9 MARCH 2020

[3] WHO. Novel Coronavirus(2019-nCoV) Situation Report – 11 31 JANUARY 2020, https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-224 sitrep-11-ncov.pdf?sfvrsn=de7c0f7_4

[4] www.bsg.ox.ac.uk/covidtracker

corresponds to a typical outbreak, while Albania curve seem like any endemic disease in the population. In front of this pandemic, the Albanian curve might be cut off as a result a small number of tests carried out by Albania authorities, 6906 tests/million population, which is far lower than tests performed by Italian authorities, which is 11 times fold (79908 test/million population[1]). Toward end of May the number of COVID-19 were dropped so both governments planned to relief closure measures by opening most of public and economic activities. In front of the fear that COVID-19 could rise up again, as a result of virus transmission amongst people that was observed in Albania, while in Italy continued with the low and decreasing trend of disease cases. Data and their comparison though different indicators or index, shows that stringency measures could contribute on a temporary diminution of new cases of COVD-19, but if not are accompanied with individual protection measures, and/or special vulnerable groups it might be a missing opportunity because the general population might lose what was achieved during national quarantine. On the other hand, taking in consideration low public spending per capita in Albania (307 USD, 2014), moving from "hummer" toward "dance" phase, managing and supporting health system is critical[2]. Public health services should be mainly the entitled authorities to monitor data and come up with specific and efficient measures in order to prevent an increase of cases on the overall population.

Keywords: Albania, Italy, stringency index, epidemic, COVID-19; Pandemic;

Introduction

The "severe acute respiratory syndrome coronavirus 2" (SARS-CoV-2), officially named as "Coronavirus Disease-2019 (COVID-19)" by World Health Organization (WHO) on February 11, 2020[3] actually the new coronavirus culpable of one of the most severe worldwide pandemic in recent history. On December 31, 2019, the WHO China Country Office documented many cases of unknown origin pneumonia in the city of Wuhan, in the Hubei Province. A new type of Chinese Coronavirus, that was isolated on January 7, 2020 and its genetic sequence was shared with the rest of the world in order to develop specific diagnostic kits and to fight this new battle together. Other possible etiological agents such as flu, avian

[1] https://www.worldometers.info/coronavirus/
[2] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020;
http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems
[3] WHO, Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov). Jan 30, 2020

influenza, adenovirus infection, Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) and Middle East Respiratory Syndrome coronavirus (MERS-CoV) were previously excluded[1].

Albania and Italy are not just two neighbour countries, but they have tight relations because of big Albania community who lives and work in Italy and business Italian people who live and work in Albania since 30 years. Therefore, are two countries which are not in the same geographic position, but enormous movement of people and goods, makes them vulnerable to each other epidemic issues. According to Imperial College COVID-19 Response team[2], two fundamental strategies are possible: (a) Suppression, here the aim is to reduce the reproduction number (the average number of secondary cases each case generates), R, to below 1 and hence to reduce case numbers to low levels or eliminate human-to-human transmission. (b) Mitigation**,** here the aim is to use non-pharmaceutical interventions (and vaccines or drugs, if available) not to interrupt transmission completely, but to reduce the health impact of an epidemic. In this scenario, population immunity builds up through the epidemic, leading to an eventual rapid decline in case numbers and transmission dropping to low levels. Albania and Italy used suppression strategy to reduce the reproduction number, hence to reduce case numbers and to protect healthcare system from being overloaded.

Methodology:

This paper is descriptive analysis, by collecting data from official sources and other think tank institutions, in order to analyse different indicators, like: daily new cases, stringency index, average tests performed to population, etc.

Results:

First step to manage the situation, or mitigate spread of virus was close of schools, universities and public activities in both countries, Albania[3] and Italy. Within few days from the appearance of the first vocid-19 cases, both countries switched strategy,

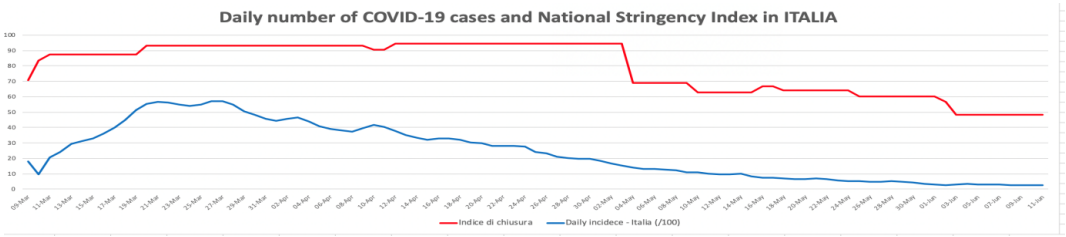
[1] WHO. Disease outbreak news: Update. 12 January 2020 https://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/; WHO. Novel Coronavirus (2019-nCoV) Situation Report - 1 21 JANUARY 2020 https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200122- sitrep-2-2019-ncov.pdf?sfvrsn=4d5bcbca_2; Wu, Z; McGoogan, JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China. JAMA. 2020; 2019: 25-28

[2] "Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand", Imperial College COVID-19 Response Team, https://spiral.imperial.ac.uk:8443/handle/10044/1/77482

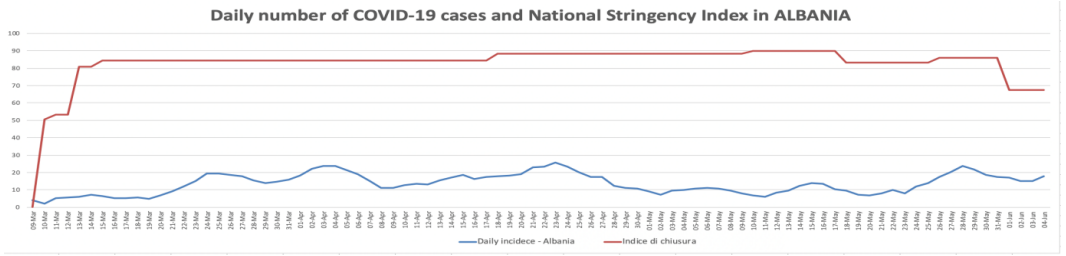
[3] Decision of Ministry of Health of Albania, No. 135, date 09.03.2020 and N0.132 date 08.03.2020

from mitigation toward suppression, by achieving stringency index about 90 (Graph,. No, 1&2)

Graph no.1: Stringency index and daily number of covid-19 in Italy

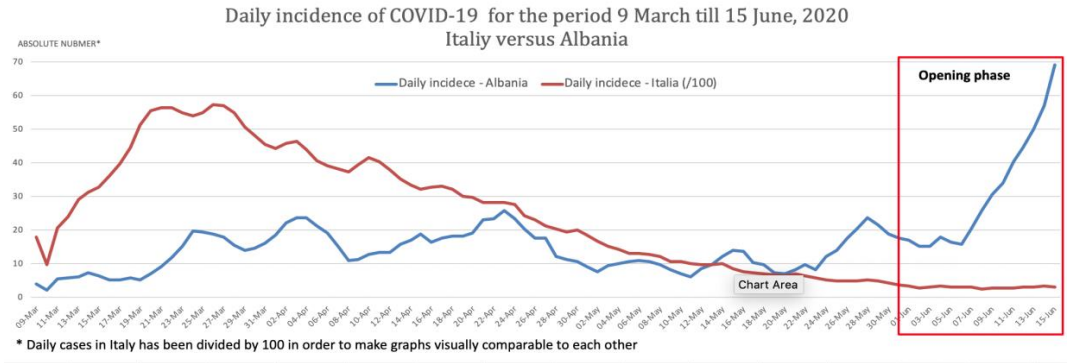


Graph no.2: Stringency index and daily number of covid-19 in Albania

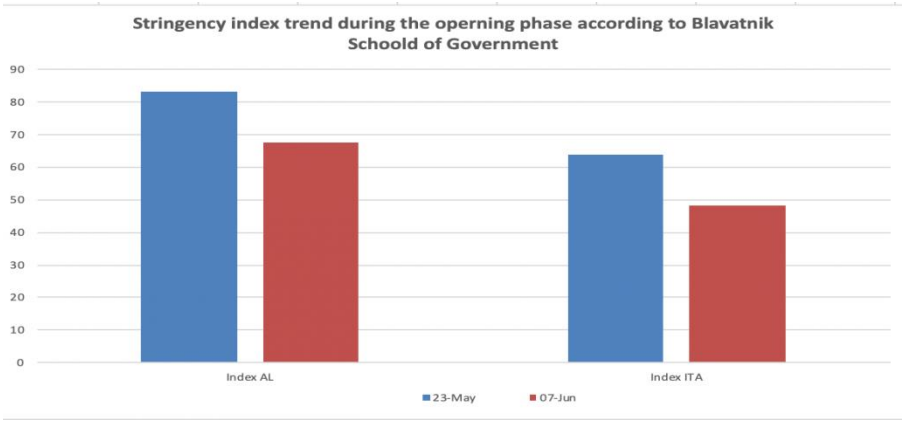


Both governments started to relief closure measures by opening most of public and economic activities, which was expected to be accompanied with an increase of daily new cases because of increased social activities. But, it happened an sharp increase of daily cases in Albania and steady situation in Italy, even because opening measures were almost the same in both countries (Graph no. 3 &4).

Graph. No. 3: Daily incidence Albania vs Italy

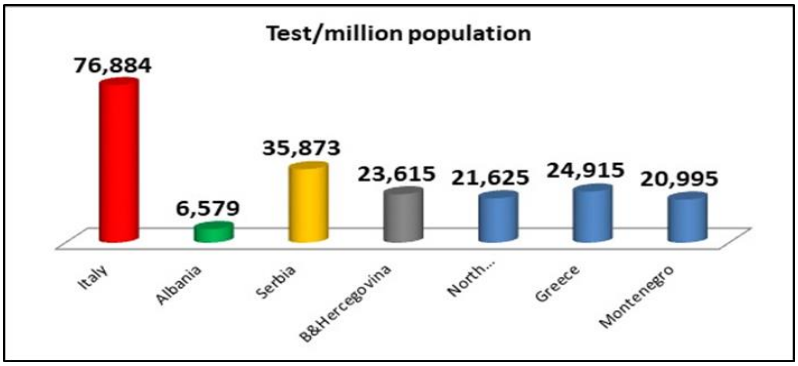


Graph. No. 4: Stringency index Albania vs Italy



Moving from "hummer" toward "dance"[1] phase, managing and supporting health system is critical[2]. The increase of new cases in Albania as relieving closure measures happened because according to Health System Analysis, 2019 Global Health Security Index[3], has very low score, 0 points in "Infection control practices and availability of equipment". On the other hand, has lower region score for "Capacity to test and approve new medical countermeasures" with 50 points, Graph No. 5 shows Albania has the lowest number of tests per million population in the region, 11 fold less than Italy.

Graph no.5: Test per million population performed in Mediterranean region



[1] https://medium.com/@tomaspueyo/coronavirus-the-hammer-and-the-dance-be9337092b56.
[2] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020;
http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems
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http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

On the other hand, workforce migration and shortages also make health systems vulnerable during a pandemic[1]. Health worker emigration has been a creeping challenge for Albania. In 2013, Albania had 128 physicians per 100,000 people, but in 2016 according to Order of Physicians there are 400 doctors have asked for "Certificate of good standing" in order to go and work abroad. As consequence of massive migration and other factors Albania has the lowest rate of medical doctors for covering healthcare to population, by 1.1 doctors for 1000 inhabitants[2].

Deep Knowledge Group study has ranked both Italy and Albania in tier 3, but Italy is ranked in 53th position with 533 points, and Albania in 88th position with 476 points[3], by scoring lower point in each field comparing to Italy (Pict. 1).

Picture no. 1: Safety Ranking by Deep Knowledge Group Albania vs Italy.

Conclusions

Data and their comparison though different indicators or index, shows that stringency measures could contribute on a temporary diminution of new cases of COVD-19, but if not are accompanied with individual protection measures, and/or special vulnerable groups it might be a missing opportunity because the general population might lose what was achieved during national quarantine. On the other hand, moving from "hummer" toward "dance" phase, managing and supporting health system is critical[4]. Taking in consideration low public spending per capita (307 USD, 2014) and low healthcare workforce 1.1 doctors for 1000 inhabitants, Albania should invest more in healthcare system. Public health services should be mainly the entitled

[1] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020;
http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

[2] Why Do Albania Doctors Migrate?, Gazment Koduzi, Ardita Kongjonaj, Vladimir Lazarevik, Europian Journal of Interdisciplinary Studies, Jan-Apr 2017, Vol.7, Nr.2, ISSN 2411-4138 (Online), ISSN 2411-958X (Print)

[3] http://analytics.dkv.global/covid-regional-assessment-200-regions/tier-2-3.pdf

[4] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020;
http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

authorities to monitor data and come up with specific and efficient measures in order to prevent an increase of cases on the overall population.

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[2] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020; http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

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[7] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020; http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

[8] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020; http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

[9] Why Do Albania Doctors Migrate?, Gazment Koduzi, Ardita Kongjonaj, Vladimir Lazarevik, Europian Journal of Interdisciplinary Studies, Jan-Apr 2017, Vol.7, Nr.2, ISSN 2411-4138 (Online), ISSN 2411-958X (Print)

[10] The economic and social impact of COVID-19, Health systems, Western Balkans, regular economic report, N0.17, Spring 2020; http://documents.worldbank.org/curated/en/650491590681594215/The-Economic-and-Social-Impact-of-COVID-19-Health-Systems

[11] WHO. Novel Coronavirus(2019-nCoV) Situation Report – 11 31 JANUARY 2020, https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-224 sitrep-11-ncov.pdf?sfvrsn=de7c0f7_4
[12] WHO. Diseaseoutbreak news: Update. 12 January 2020 https://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/; WHO. Novel Coronavirus (2019-nCoV) Situation Report - 1 21 JANUARY 2020 https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200122- sitrep-2-2019-ncov.pdf?sfvrsn=4d5bcbca_2; Wu, Z; McGoogan, JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China. JAMA. 2020; 2019: 25-28outbreak-of-novel-coronavirus-(2019-ncov). Jan 30, 2020
[13] WHO. Novel Coronavirus(2019-nCoV) Situation Report – 11, 9 MARCH 2020
[14] Decision of Ministry of Health of Albania, No. 135, date 09.03.2020 and N0.132 date 08.03.2020

The Role of Hemodialysis in Sensorineural Hearing Loss in Chronic Kidney Failure Patients

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Abstract

Chronic renal failure affects all organ systems. Senses are not exception and hearing impairment in this group of patients is very common, particularly sensorineural hearing loss (SNHL). The aim of this study is to evaluate if hemodialysis affects hearing in patients with chronic kidney failure. This is a transversal study. In this study were included 65 patients. 21 (32.3%) female patients and 44 (67.7%) male patients Study was performed in the American Hospital 2 of Tirana during years 2015-2016, 27 (41.5%) patients during 2015 and 38 (58.5%) patients during 2016. In our study there is no characteristic connection between level of hearing loss and number of months in hemodialysis. The same result is that there is no characteristic connection between medium number of months of kidney failure and level of hearing loss. There are controversial results in many studies about this correlation but without clear results. Sensorineural hearing loss is very common in hemodialysis patients. Sensorineural hearing loss in hemodialysis patients in our study is not affected by the number of hemodialysis sessions and by the number of months with kidney failure. But still there are needed more studies in large groups of patients to arrive in a definitive conclusion.

Keywords: sensorineural hearing loss, hemodialysis sessions,

Introduction

Hearing impairment is very common in end stage renal disease patients. Sensorineural hearing loss is much more common in this group of patients than conductive hearing loss.(1) Literature data report that 20–87% of these patients have sensorineural hearing loss.(2)

Hearing loss is a common finding in patients with chronic renal failure, and deafness may occur during the course of hemodialysis. About the role of hemodialysis in causing hearing loss there are controversial studies.

Methodology

The study included 65 patients in end stage renal disease treated with hemodialysis, three times a week, for 4–4.5 hours, using capillary dialyzers made of cellulose diacetate or polysulphone, of the surface area of 1.5–2.2 m^2, of predominantly low permeability, sterilized by g-irradiation or ethylene oxide, with common blood (250–300 mL/min) and dialysate flow (500 mL/min). Water for dialysis was prepared by reverse osmosis, and conductivity of below 10 $\mu S/cm^3$ was ensured. Exclusion criteria were history of exposure to noise, Alport's syndrome and those with conductive and/or mixed hearing loss confirmed by pure tone audiometry. The patients underwent examination by the otorhinolaryngologist which was familiar with the study. HT was measured for air and bone conductivity, for both ears, for frequencies of 125, 250, 500, 1000, 2000, 3000, 4000, 6000 and 8000 Hz.

We were based on World Health Organization Grades of Hearing impairment (WHO 2008) for the classification of hearing loss in hemodialysis patients.

Grade of impairment*	Corresponding audiometric ISO value**	Performance	Recommendations
0 - No impairment	25 dB or better (better ear)	No or very slight hearing problems. Able to hear whispers.	
1 - Slight impairment	26-40 dB (better ear)	Able to hear and repeat words spoken in normal voice at 1 metre.	Counselling. Hearing aids may be needed.
2 - Moderate impairment	41-60 dB (better ear)	Able to hear and repeat words spoken in raised voice at 1 metre.	Hearing aids usually recommended.
3 - Severe impairment	61-80 dB (better ear)	Able to hear some words when shouted into better ear.	Hearing aids needed. If no hearing aids available, lip-reading and signing should be taught.
4 - Profound impairment including deafness	81 dB or greater (better ear)	Unable to hear and understand even a shouted voice.	Hearing aids may help understanding words. Additional rehabilitation needed. Lip-reading and sometimes signing essential.

Table 1: World Health Organization Grades of Hearing impairment (WHO 2008)

Results and Discussion

In this study were included 65 patients. 21 (32.3%) female patients and 44 (67.7%) male patients Study was fulfilled in the American Hospital 2 of Tirana during years 2015-2016. 27 (41.5%) patients during 2015 and 38 (58.5%) patients during 2016. 81.5% of patients under hemodialysis had sensorineural hearing loss.

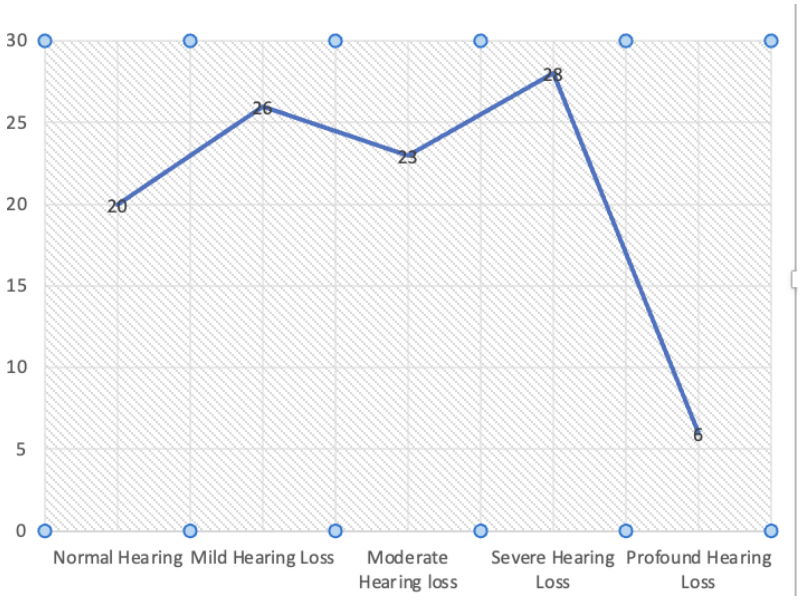

Table 1. Correlation between months in hemodialysis and levels of hearing

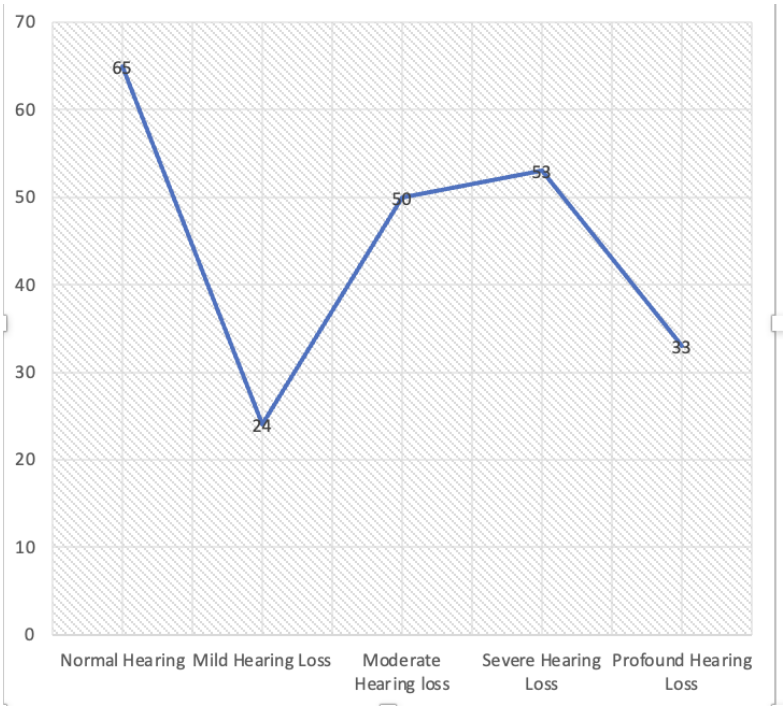

Table 2. Correlation between medium months of kidney disease and levels of hearing

In our study there is no characteristic connection between level of sensorineural hearing loss and number of months in hemodialysis. The same result is that there is no characteristic connection between median duration of kidney failure and level of hearing loss. This result is in accordance with the study of Jamaldeen et al. Based on the study of Jamaldeen and al the effects of hemodialysis in sensorineural hearing loss are still unclear. Studies about influence of hemodialysis on hearing loss are contradictory, with a number of studies that report that hemodialysis does not play a role in hearing loss connected with kidney failure. Even though in many studies was noted that duration of chronic disease has no connection with hearing loss. A recent study showed that the longer the duration of disease the worse hearing loss. Hearing loss was more evident in elderly and in patients that had less hemodialysis sessions.(3) Also Nikopoulos et al. did not arrived in a definitive conclusion about the effects of hemodialysis in sensorineural hearing loss of patients with chronic kidney failure.(4)

Based on the study of Samir et al. there are evidences of effects of hemodialysis in worsening of sensorineural hearing loss. They found clearly higher incidence of cochlear disfunction in children in hemodialysis than in children with conservative treatment with the same median duration of kidney failure as hemodialysis.(5)

Also, Ghassemi et al. mentioned that hemodialysis does not play a role in sensorineural hearing loss in patients with kidney failure. But Hemodialysis corrects electrolytic and metabolic disturbances. Hemodialysis decreases the risks for sensorineural hearing loss because it stabilizes metabolic and electrolytic disturbances caused by chronic kidney failure.(6)

Based on the study of Reedy et al. there is high prevalence of sensorineural hearing loss in hemodialysis patients but there is no correlation that hemodialysis does affect the sensorineural hearing loss in this group of patients.(7)

In the study of Lasisi et al. patients with sensorineural hearing loss had less hemodialysis sessions what suggests a connection between the increase of hemodialysis sessions and hearing loss. So, there is data that support the beneficial role of hemodialysis in sensorineural hearing loss. (8

A great number of patients have arterial hypotension and embolism during dialysis sessions and have hearing loss after vascular collapse. In some of these patients the hearing gradually returns to normal and in some partially. Arterial hypotension is present also in other situations as myocardial infarction, vasovagal situations and shock, but hearing loss is not present in these situations. In experimental studies is showed that vessels of the inner ear are not affected from autonomous nervous system. In hemodialysis with fast ultrafiltration is noticed acute mononeuritis. It is believed that rapid decrease of extracellular volume causes neural ischemia. It is known that neuritis is present in uremic patients but the cause is not known. There are not discovered yet uremic toxins or other specific pathologic anomalies in

cochlear and vestibular nerve of temporal bones of patients with chronic kidney failure undergoing hemodialysis.(9)

Conclusion

Sensorineural hearing loss is very common in hemodialysis patients. Sensorineural hearing loss in hemodialysis patients in our study is not affected by the number of hemodialysis sessions and by the number of months with kidney failure. But still there are needed more studies in large groups of patients to arrive in a definitive conclusion.

Acknowledgments

We would like to thank the patients for their collaboration.

Conflict of Interest

The authors declare that they have no conflicts of interest.

Author Contributions

Emirjona Vajushi followed these patients, drafted and revised this manuscript.

Ethics Approval

An Ethics Approval Statement was not required for this report.

Animal Rights

This article does not contain any studies with human or animal subjects performed by the any of the authors.

Data Availabilty Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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An Overview of Correlations Between Therapeutic Uses and Chemical Composition of *Morus nigra* and *Morus alba* Species Fruits

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Abstract

The therapeutic effects of the *Morus nigra* L. and *Morus alba* L. fruits can be highlighted by their bioactive principles composition. The paper correlates recognized therapeutic uses of mulberries species in folk medicine with the chemical composition literature data. Phytotherapeutic treatments based on mulberry fruit extracts are highlighted, which have given very good results in many diseases such as, allergies, asthma, gout, rheumatism, chronic fatigue, growth disorders, circulation disorders, hoarseness, pharyngitis, tonsillitis, hepatitis viral stress and exhaustion, vitamin and mineral deficiencies, hypercholesterolemia, gastroduodenal ulcer, prostate cancer. In the present paper, applying specific methods to pharmacognostic studies, active principles have been identified in various concentrations of hydroalcoholic fruits extracts. Could be consider that the indigenous vegetable products *Morus nigra* L. and *Morus alba* L. fructus harvested from the Dobrudja area flora, eastern of Romania, region with a favorable climate for the accumulation of vitamins and active ingredients, represents an important source of total phenols, ascorbic acid, citric acid, niacin and riboflavin. The increased content of carotenoids pigments and phenolic compounds emphasize the valuable antioxidant activity, which could be corelated also, with their important minerals content such as, K, Na, Ca, Mg, Fe, Zn. In order for these natural substances to be properly accumulated by the human body, we recommend the second half of June as the optimal harvest period for ripe fruits and using in various phytotherapeutic forms, juices, syrups, teas, or as fresh food fruits.

Keywords: *Morus nigra* L., *Morus alba* L., phytotherapeutic, antioxidant activity, phenolic compounds

Introduction

The mulberries reside into the Morus genus, family Moraceae. Twenty-four species of Morus have been found to exist in the world with over one hundred different varieties. Morus species can be found from the Northern hemisphere to the Southern one and can grow in temperate and subtropical regions. They are widely spread from sea level to up to 4000 m altitude [1]. The name of the plant has its origin in Turkish *dut* <Persian (*tut*): mulberry, s.m. = the name of two species of trees with asymmetrically lobed leaves, with small, fleshy, white (*Morus alba* L.) or black-reddish (*Morus nigra* L.) fruits, with a sweet fad taste, whose leaves represent food for silkworms; acute; From the Turkish *dut*. = tree with small, fleshy, white or black fruits (*Morus alba*, *Morus nigra*). It has been suggested that the generic Morus name comes from the Latin word *mora* (delay) due to the late appearance of buds [2].

The genus *Morus* (mulberry) is represented by trees with a height of 12-15 m, originating from China and Japan (white mulberry) and from Persia (black mulberry). Mulberry displays a long history of therapeutic and medicinal use in China, with almost every part of the plant being exploited. It is currently widespread in Asia, Europe, Africa and North America. In Romania it is cultivated in the hill and plain areas. As a plant it belongs to the branch Magnoliophyta, class Magnoliopsida ordinal Rosales family Moraceae, genus Morus [3].

The black mulberry has been known throughout southern Europe since ancient times, and is thought to have been brought from Persia. It has been mentioned by most early Greek and Roman writers; Pliny observed it and described its use as a medicinal plant. Its leaves were used by the Romans to treat diseases of the mouth, trachea and lungs, and since the 17th century the bark of the roots has been used here as a dewormer, and also as a dye [4].

Mulberry leaves oftenly serve as food for silkworms. In ancient times, silk was considered a product of mulberry leaves, the activity of silkworms not being known and understood. The worm culture was introduced by Justinian of Constantinopole (527-565). In Italy, the black mulberry was used to grow silkworms until about 1434, when the white mulberry was introduced from the Levant, which was after that point the preffered choice [5]. Mullbery leaves have been used in the past as tea or powder juice [6]. In Korea, mulberry leaves are used to make ice-cream flavors and in India, they are used as a good nutritious, cheap food for breakfast and dinner [7]. Currently mulberry leaves have been approved as an excellent food source rich in protein, vitamins, microelements and dieteray fibers.

Mulberry leaf contains tannins, flavonoids, glycosides. Recent studies have shown the presence of a substance - 1-Deoxynojirimycin - inhibitor of the enzyme glycosidase I with a role in the processing of oligosaccharides in the body, thus being responsible for the hypoglycemic effect of the leaf.

In the present paper, through applying specific methods to pharmacognostic studies, active principles have been identified in various concentrations of black and white mulberry hydroalcoholic fruits extracts.

Morus nigra L. and *Morus alba* L. in folk medicine

As a traditional folk medicine, mulberry was used as an analgesic, emollient, sedative, the leaves being considered antibacterial, astringent, diaphoretic, hypoglycemic, dental and ophthalmic. Bark tincture is used to relieve toothache. Romanian traditional medicine from the beginning of the 20th century used the peel of mulberry root with a hot and bitter taste, for its purgative action, e.g. Mororum syrup, is prepared from the fruit, with a laxative, slightly diuretic effect. The white mulberry had several uses in the popular tradition: the leaves represented food for silkworms, the fermented fruit was used to produce brandy and the mulberry leaf tea was used to cure liver disease. From the bark of the black mulberry branches, gathered in the spring, which was boiled and sweetened with sugar, a cure was obtained - which was taken in the morning, on an empty stomach, against tapeworm [8]. Mulberry is used as an excellent remedy in the treatment of: lung diseases, gastric and duodenal ulcers, sore throats, diarrhea (mulberry leaves), diabetes, chronic enteritis, stomatitis, tapeworms (bark), asthenia (mulberry leaves) [8].

In natural products mulberry leaves are used mainly due to their hypoglycemic action, being indicated in mild forms of diabetes. Mulberry leaves are also used for their valuable antioxidant properties.

Popular treatments with mulberry

Mulberry fruits, if eaten in the morning, 200 g on an empty stomach for 10 days, will cleanse the body of toxins. Also, the juice of ripe mulberry fruit, due to the citric acid it contains, is considered an excellent remedy in treating canker sores, angina and stomatitis.

Mulberry syrup is very effective in treating constipation. It is prepared with the help of a cup full of ripe mulberries, 2 cups of sugar and a liter of water. After boiling and reboiling several times, it is recommended, after cooling that the mulberry syrup be stored in a tightly closed container and kept in a cool place.

Mulberry leaf tea is drunk three times daily after each main meal and has an effect in treating diabetes and diarrhea. This mulberry leaf tea is also recommended to treat chronic enteritis and intestinal worms [9]. Mulberry root peel is very useful in treating ascites and intestinal worms. Thus, 2 crushed teaspoons of the root peel are boiled in 300 mL of water, until the liquid drops to 200 mL.

Material and method

The indigenous vegetable products *Morus nigra* L. and *Morus alba* L. fructus harvested from Dobrudja area flora, eastern of Romania, have been used. The plant material researched, mulberries represent the fruits of the black mulberry, *Morus nigra* L., and

the white mulberry *Morus alba* L. called drupes. Harvesting is done from Dobrudja spontaneous flora and crops, manually, from May to the end of June period.

The whole, healthy, well-ripened, black fruit have been harvested. The transport was done in paper bags, the plant material was protected from the direct action of the sun and high temperatures that could favor fermentation.

For the study, black mulberries were harvested from gardens and yards, which benefited during the development of different climatic and soil conditions in the Constanta area. These areas have brown and yellow-brown wild soils, with average annual temperatures of 9-11 °C. First, a general description for the botanical characterization of the plant was made.

The pharmacognostic study was performed using specific methods. In order to identify the active ingredients, we used the vegetable product remaining from the alcohol extraction, dried and extracted with 100 mL of water in a 90 °C water bath for 30 minutes. The solution is used for reactions, specific to groups of active principles soluble only in water (oozes and polyoozes) or not depleted by alcohol (tannins, alkaloids, etc.).

Etheric extractive solution

It was weighed 10 g of freshly sprayed vegetable product, which was first extracted with ethyl ether (2 x 50 mL), refluxing for 15 minutes. Each reflux was followed by filtration, the obtained solutions being collected in a ground flask. The ether solutions were concentrated on a water bath to 50 mL Solution A was obtained. It was used to carry out the reaction characteristic of lipophilic compounds. The ether-depleted vegetable product was stored for further alcohol extraction [8], [10].

Alcoholic extractive solution

The vegetable product depleted with ether, was brought to the water bath, in order to remove traces of ether. The vegetable product was extracted with methylic alcohol (2 x 100 mL) by refluxing for 30 minutes. The combined methanolic solutions have been concentrated to 50 mL by distillation of the solvent and have been divided into two parts. One part was used to identify the active principles on the non-hydrolyzed solution (25 mL), and the other part was subjected to hydrolysis with 15 mL 10% hydrochloric acid on the electric jacket, with water for 30 minutes (Fig. 4.2). Exhausted vegetable product is stored for water extraction.

Water extractive solution

It was used the remaining vegetable product from the alcohol extraction, dried and extracted with 100 mL of water in a 90 °C water bath for 30 minutes. The solution was used for reactions specific to groups of active principles soluble only in water (oozes and polyoozes) or not depleted by alcohol (tannins, alkaloids, etc.).

To identify the chemical compounds in the three extracts, we analyzed them separately, using methods corresponding to the physicochemical properties for each group of active principles.

Results

Botanical characterization

Mulberry are woody plants (trees, shrubs), herbaceous, that contain a latex, rich in rubber. They possess a straight, gray stem, branched from a low height, with a sparse crown. Mulberry leaves are thin, very different in shape (ovate or elliptical, acute or short acuminate), with a round base and an irregularly serrated edge; they are divided into 3-5 unequal or undivided lobes, glabrous, smooth, slightly glossy on the face and short pubescent at the ribs, on the back [11]. The unisexual flowers, grouped in cymose or amentiform inflorescences, are arranged monoeciously or dioeciously. The mulberry is a dioecious plant, so for 5-6 females a male is planted. There is also the possibility of grafting a male branch on a female crown. The flowers are unisexual, the male ones are cylindrical, and the female ones are oblong. It blooms in May. The plant bears fruit only from the age of 7-9 years.

Fig. 1. *Morus nigra* L. tree and leaves *(original)*

Fig. 2. *Morus alba* L. tree and leaves [23]

Fig. 3. *Morus nigra* L. leaves [24]

Fig. 4. Morus alba L. leaves [25]

Morus nigra is a deciduous tree that can grow up to 12 meters tall and up to 15 meters broad. Its leaves are 10-20 cm long and 6-10 cm broad, long, downy on the underside and short and rough on the surface, see Figs 1, 3 and 5.

Morus alba is a medium sized tree which grows up to 20 meters tall. It generally has a pretty small lifespan, although there are few exceptions that can live up to 250 years. If the tree is old the leaves are up to 12 cm long, sawlike on the edges, circular at the top and cordate at the base. The fruit is simple (achene or drupe) or compound, formed by the development of the receptacle, the perigon and the axis of the inflorescence. The fruit (mulberry) is composed of numerous false, small drupes, arranged on the axis of the inflorescence, which becomes fleshy. The multiple fruit is called sorose (mulberry, acute), see Figs 2, 4 and 6.

Fig. 5. *Morus nigra* L. fruits [24]

Fig. 6. *Morus alba* L. fruits [26]

Black mulberry is an edible fruit, its dark purple color is given by anthocyanins. The fruit contains small drupes that form a cluster, each drupe being 2-3 cm long. Black mulberry each drupe being 2-3 cm long [8]. Black mulberry fruits are richly flavoured in comparison to the white mulberry which are more insipid. White mulberry is

cultivated in many areas for the production of silk and for the fast release of pollen. Mulberry fruits are 1.5 cm long, in wilderness it can be of deep purple color, but usually the cultivated plants have white to pink fruits [8]. In comparison to black and red berry, fruit is sweet but bland.

Table 1 Differences between the two *Morus* varieties

***Morus alba* L.**	***Morus nigra* L.**
The leaves of the white mulberry have a length of 5-12 cm, are fragile, shiny, smooth and often lobed	The leaves of the black mulberry are larger (up to 20 cm), thick, rough and rarely lobed.
The white mulberry fruit is ripe in late spring	The fruit of the black mulberry is not ripe until early summer.
The white mulberry fruit has a long stalk (sometimes the length of the fruit)	The black mulberry fruit has practically no stalk or a very short stalk.
The white mulberry fruit is sweet before ripening, but not very sweet when it is ripe	The black mulberry fruit if very acid before ripening and it is very sweet when it is ripe
White mulberry fruit is generally unappreciated in some countries	The aroma of black mulberry fruit attracts almost the whole general public

Important bioactive compounds present in *Morus nigra* L. and *Morus alba* L. fruits

Following the reactions performed on the three extracts, etheric, alcoholic and aqueous obtained from the fruits of the species *Morus nigra* L. and *Morus alba* L., the many active principles were identified, see Table 2. The aglycones from the etheric extractive solution have been obtained through evaporation, after treating the obtained residue with CH_3OH, using the Shibata reaction [8].

Table 2. Active principles identified in the three extracts from the fruits of *Morus alba* L. and *Morus nigra* L. species

Analyzed solution	***Morus alba* L.**	***Morus nigra* L.**
Etheric extractive solution	Aglycones (flavonic, anthraquinone, coumarines and triterpenes)	Aglycones (flavonic, anthraquinone, coumarines and triterpenes)

	Volatile oils	Volatile oils
	Fatty acids and resin acids	Fatty acids and resin acids
	Alkaloid bases	Alkaloid bases
	-	Carotenoids
	Sterols	Sterols
Alcoholic extractive solution	Gallic tannins	Gallic tannins
	Resins and alkaloids	Resins and alkaloids
	Reducing compounds	Reducing compounds
	Flavonoides	Flavonoides
	Sterol and triterpene heterosides	Sterol and triterpene heterosides
	Alkaloids	Alkaloids
	Amino acids	Amino acids
	Polyphenols	Polyphenols
	-	Antocianosides
Water extractive solution	Polyholosides (mucilages)	Polyholosides (mucilages and pectins)
	Oozes and polyoozes	Oozes and polyoozes
	Gallic tannins	Gallic tannins

Volatile oils have been obtained using evaporation, treating the residue with alcohol, sterols and triterpenes using the Liebermann-Burchard reaction, carotenoids using the reaction with H_2SO_4 [8]. In the alcoholic extractive solution, the gallic tannin was identified using $FeCl_3$ reaction, alkaloids using the Mayer and Bertrand reaction and antocianosides were identified using an aqueous solution with acid pH [8]. The oozes and polyoozes from the water extractive solution have been identified using extract concentration and the residue was treated with H_2SO_4 and with Timol alcoholic solution [8].The ether extract contains valuable lipophilic, chemical compounds. The carotenoids that were found only in *Morus nigra* are highlighted. In the alcoholic extract there are hydrophilic chemical compounds. Table 2 highlights the existence of alkaloids in both etheric and alcoholic extractive solutions. In the aqueous extract, in addition to the alcohol-soluble compounds, except for the resins, there are polyholosides such as, pectins, mucilages, gums [8], [10].

Discussions

Phytotherapeutic treatments based on mulberry fruit extracts

The active principles of the black mulberry fruits *Morus nigra* L., *Morus alba* L. are synthesized in plant cells. In order for these natural substances to be properly utilised by the body, they must be found in various phytotherapeutic forms (juices, syrups, teas) [12]. The phytotherapeutic treatment based on mulberry fruit extracts gave very good results in the following diseases: allergies, asthma, gout, rheumatism, chronic fatigue, growth disorders, circulation disorders, hoarseness, pharyngitis, tonsillitis, viral hepatitis, conditions stress and exhaustion, vitamin and mineral deficiencies, hypercholesterolemia, gastroduodenal ulcer, prostate cancer. We consider that the vegetable product *Morus nigra* L. fructus harvested from the local flora is an important source of total polyphenols. We recommend the second half of June as the optimal harvest period, and as areas with a favorable climate for the accumulation of vitamins and active ingredients, from the the hilly and mountainous areas [13].

Phytotherapeutic treatments based on mulberry leaf extracts

Mulberry leaves contain mainly moranolin or L-deoxynojirimycin (DNJ), a piperidine alkaloid that inhibits the intestinal enzymes responsible for the breakdown of complex carbohydrate molecules into simple absorbable sugars. It is one of the strongest alpha-glucosidase. The concentration of DNJ in most mulberry leaf products is less than 0.2%. Extracts obtained from young mulberry leaves can contain between 0.5 and 3% DNJ. After oral absorption, moranoline is absorbed into the circulation and then rapidly excreted in the urine. Regarding the total alkaloid content found in mulberry fruits, it was reported for *Morus alba* L. 660 ± 5.25 mg / 100g FW and for *Morus nigra* L. 630 ± 5.93 mg / 100g FW [14], [15].

Hypoglycemic action

Mulberry leaves have been used in diabetes treatment since the earliest times. The effect of preventing and treating type II diabetes has been confirmed by recent studies by researchers in humans and laboratory animals. It is believed that this antiglycemic action is due to the synergistic effect of moralinoline, glycopeptides, flavonoids [16]. An important category of consumers prefer supplements from plant extracts to synthetic substances. In addition, mulberry leaf extract also contains compounds that stimulate insulin secretion and antioxidants.

Anti-inflammatory and anti-allergic action

Flavonoids and related compounds isolated from mulberry bark have anti-inflammatory effects. The extract obtained from the bark of Morus root in hot water possesses strong antihistamine and antiallergic activity [16].

Vasoactive action

Mulberry leaves can have a significant cardiovascular effect. Two main components of the

leaves, rutin and quercetin, induce considerable vasorelaxation.

Neuroprotective action

In diabetes there are subtle disturbances that include alterations in neurotransmissions, which generates learning disabilities and memory deficits. Indeed, the ability to learn and memorize is reduced in patients with type I diabetes, and those with type II diabetes have been observed to impair verbal memory or complex information processing [17]. The methanolic extract obtained from mulberry leaves has antidopamine activity, demonstrated experimentally in mice. The experiment confirms the potential of the clinical applications of mulberry in the management of psychiatric diseases. In addition, the mulberry possesses adaptogenic activity demonstrated on a model animal with chronic stress, with the possibility of its clinical use as an anti-stress agent [16].

Anticancer action

The methanolic extract of mulberry leaves shows strong cytotoxic action against cancer cells. A glycoside was isolated from the bark of Morus root, which significantly inhibited the proliferation of human ovarian cancer cells [16].

Anti-obesity action

Studies in rats with diet-induced obesity have shown that chronic treatment with ethanol extract obtained from mulberry leaves has an anti-obesity effect. This effect can be partly explained by the antagonistic action of mulberry extract on hormone receptors, which ultimately lead to a decrease in body weight [17].

Lipid-lowering action

Diabetes is associated with many lipid abnormalities. The extract obtained from mulberry leaves in butanol inhibited the growth of cholesterol, preventing atherosclerosis. Treatment with traditional Chinese herbs, including *Morus* sp., significantly reduces the accumulation of alcohol-related liver lipids, restores normal liver lipid levels, after four weeks of treatment and can be used as a remedy to prevent or treat alcohol-induced fatty liver [18].

Antioxidant and antimicrobial action

Lipid peroxidation of cell membranes can lead to cell necrosis and is thought to be involved in many pathophysiological conditions such as type I diabetes. Free radicals and reactive oxygen species also predominate in diabetes [18].

Mulberry contains several antioxidants compounds: polyphenols, carotenoids, vitamins A, C, E, which increase the antioxidant status of the body and modulate oxidation through various mechanisms [19].

The total polyphenols content has been determined using the Folin-Ciocalteu method and results may be different in the two species such as, in *Morus nigra* it has been identified 880±7.20 mg/100 g FW and in *Morus alba* 1650±12.25 mg/100 g FW [20]. Among the vitamins, mulberry fruits contain a significant amount of ascorbic acid, in *Morus nigra* 15.37±0.89 mg/100 g FW has been identified and in *Morus alba* 15.20±1.25 mg/100 g FW [20]. Other vitamins found were Niacin, for *Morus alba* 3.10 ± 0.60 mg / 100 g FW, and for *Morus nigra* 1.60 ± 0.1 mg / 100 g FW were reported.

A diet rich in plant antioxidants has been inversely correlated with mortality from coronary heart disease. Mulberry contains as main flavonoids quercitin-3-(6-maloniglucoside), the most abundant flavonol-glycolose in mulberry fruits. These have shown antioxidant activity in various experimental animal models. In order to ensure the stability of the antioxidant components and to preserve the antioxidant activity of the mulberry preparations, it is important that the leaves are dried at a controlled temperature, 60 °C [19].

Also, mouthwashes based on mixtures black mulberry, bitter cherry and cornelian cherry fruits hydroalcoholic extracts, present a significant antioxidant and antimicrobial activity and could be recommended in the oral cavity affections treatment, gum inflammations, dental pains, preventing of bacterial plaque formation, halitosis and would be a possible new antimicrobial alternatives, with lesser side effects that are often associated with synthetic antimicrobials [21, 22].

Minerals content

The *Morus* sp. minerals content it is also highlighted in the literature [20]. Thus the most potassium content is found in *Morus alba* 1731 ± 11.5 mg / 100 g FW and in *Morus nigra* 1270 ± 9.36 mg / 100 g FW, followed by calcium 576 ± 7.37 mg / 100 g FW for *Morus alba* and 470 ± 6.95 mg / 100 g FW, sodium and magnesium are comparable values. For sodium in *Morus alba* 280 ± 3.5 mg / 100 g FW and in *Morus nigra* 272 ± 5.32 mg / 100g FW, and for magnesium in *Morus alba* 240 ± 3,905 mg / 100 g FW and in *Morus nigra* 240 ± 3.51 mg / 100 g FW. Iron was also identified in *Morus alba* 73.0 ± 2.6 mg / 100 g FW and in *Morus nigra* 77.6 ± 1.98 mg / 100 g FW. It can be mentioned that all the values shown are highlighted to argue the antioxidant and nutritional action of *Morus* species. The registered values are different depending on several factors such as the type of soil, the area where the plant is grown, the local climate, etc.

Conclusions

The bioactive principles identified in the species *Morus alba* L. and *Morus nigra* L. make this plant particularly useful. Along with its importance as food for silkworms, knowing the beneficial actions for the human body is an important step to capitalize

on the health benefits of Morus. Phytotherapeutic treatments based on extracts from leaves and fruits of *Morus nigra* L. and *Morus alba* L. species are supported by the chemical compositions of the vegetal products and are verified by their use over time.

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