

th International
Congress of
Nutritionists

.....

**BOOK OF
ABSTRACTS**

.....

8th - 10th November 2019
ZAGREB, Croatia

IMPRESSUM:

Organizer

Croatian Federation of Nutrition Associations

Co-organisers

American Society for Parenteral and Enteral Nutrition

Federation of European Nutrition Societies

Student Association of Faculty of Food Technology and Biotechnology "Procion"

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www.kongresnutricionista.com

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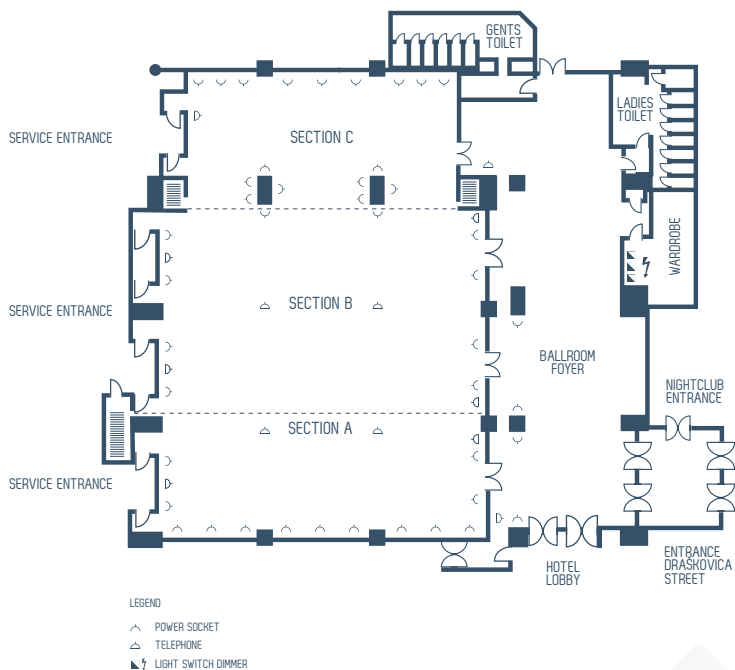
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TEMA

TRUDNOĆA



Dear colleagues and friends,

On behalf of the **Croatian Federation of Dietetic Associations** it is my great pleasure and honor to wish you a warm welcome to the **7th International Congress of Nutritionists**. We are proud to have great international partners as Federation of European Nutrition Societies (FENS) and American Society for Parenteral and Enteral Nutrition (ASPEN). Their partnership gives us acknowledgment for doing and courage to continue to do good work! Of course, one of the most important partnerships is with young and enthusiastic colleagues which is why we cherish our collaboration with student society PROBION. This year a wide range of sessions, symposia, clinical tracks and workshops will all be on offer. The scientific programme will include a diverse set of fascinating speakers presenting cutting-edge lectures and educational sessions to make the 7th Congress a must attend event for enthusiasts in the world of nutrition science.

International Congress of Nutritionist is the opportunity to share field research interests, present original works, network, but also to see old friends and meet new colleagues.

Your opinion, suggestions and comments are highly appreciated so please be active, share your knowledge and become a part of the future Congresses.

Once again welcome to Zagreb and thank you for being part of the 7th International Congress of Nutritionists.

Have a nice time!

Tena Niseteo, MSc, PhD
President of the Organizing Committee of the 7th International Congress
of Nutritionists

Croatian Federation of Nutrition Associations

Croatian Federation of Nutrition Associations (CFNA) is a national organization which acts as an umbrella society of nutritionists and dieticians in Croatia. CFNA was founded in order to unite nutritionists and nutritionists' associations into a unique and powerful association that works together to promote, develop, improve and preserve the nutritionists' and dietitians' professions which have a clearly defined education.

The Croatian Federation of Nutrition Associations is the organizer of the International Congress of Nutritionists which is held every year. This Congress is unique as it brings together not only nutritionists, but also experts from various fields of science with same interest and aim: food technologists and engineers, agronomists, medical doctors and other allied health professionals, pharmacists, kinesiologists, and psychologists and offers them the platform for exchanging the latest scientific knowledge related to nutritional science.

The vision of the Croatian Federation of Nutrition Associations is to bring together all the existing associations of nutritionists and/or dieticians in order to improve cooperation and support among nutritionists on the territory of Croatia in purpose to promote the social status of nutritionists in Croatia and creating high quality conditions for work, scientific research and international cooperation.

The mission of the Croatian Federation of Nutrition Associations is to improve the social status of nutritionists and their competences by taking care of their professional needs and interests as well as lifelong education and training, but also to promote, raise awareness and educate the public on the importance of proper nutrition in line with the campaigns of City, State, European and World healthcare institutions and organizations as well as food industry and educational institutions.

Welcome to the 7th International Congress of Nutritionists!

Tena Niseteo, PhD
President of Croatian Federation of Nutrition Associations



The Host

Zagreb is the Croatian capital and relatively young middle-European metropolis with about 800.000 inhabitants. With urban agglomeration Zagreb has about 1.1 million, a quarter of the total population of Croatia. Zagreb covers a total area of 641 square kilometres. Commoners divide it as "old" and the "new" Zagreb with the river of Sava as its boundary. Everything is accessible on foot – from your hotel to the theatre, wandering around the old Upper Town or through the bustling streets of the more modern Lower Town, which has not lost an ounce of its charm despite the eternal march of time. It is therefore no wonder that in 2017 it won the prize for the most exciting European destination. Today, Zagreb is the political and cultural center of Croatia and is a thriving, energetic inland city with some of the country's best museums, restaurants, and shopping.

Sheraton Zagreb Hotel is located in the heart of Zagreb close to main city attractions, completely renovated in 2015. Sheraton Zagreb Hotel is part of the HUP-ZAGREB hotel company that acts as the oldest in this area. All 306 spacious and light rooms and suites offer a pleasant and comfortable ambient with all the modern amenities and services. The elegant and multifunctional event venues are the ideal location for conferences, meetings and other events - 13 salons and meeting rooms that amount to a total of 1080 m² in congress spaces are the reason why in 2019 Sheraton was selected as the host for the 7th International Congress of Nutritionists.





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Hrvatsko
društvo za
hipertenziju

POSTER SECTION	POSTER CODE	TITLE
CLINICAL NUTRITION	KP01	Nutritional risk screening in cardiological patients at the Clinical hospital center Rijeka
	KP02	Hydration – does it affect body weight?
	KP03	The importance of a nutritionist-planned diet in inflammatory bowel disease treatment
	KP04	Supplements of nutrition in virus infection
FUNCTIONAL FOOD	FH01	Ex vivo analysis of antioxidant activity of alcoholic extract of hemp (<i>Cannabis Sativa</i> L.)
	FH02	Extraction of isothiocyanates from white, brown and black mustard seeds and their inhibitory activity of cancer cells proliferation
PUBLIC HEALTH	JZ01	Parental education, employment and income influence children's screen time, sleep duration and cardiometabolic risk – the case of school age children from the city of Osijek
	JZ02	Supporting the implementation of guidelines for healthy nutrition in pregnancy
	JZ03	An example of promoting healthy nutrition in a local rural community
	JZ04	Guidelines for healthy nutrition – professional support and monitoring project for healthy menus in kindergartens and schools



nutribel
Complex

I pakiranje sadrži:

- 300 kcal
- 20 g proteina
- 1,1 g EPA-e*
- 3 g vlakana

Okusi: čokolada, cappuccino, naranča-keks

NA OSNOVNOJ LISTI LIJEKOVA HZZO-a

NUTRIBEL Complex - hrana za posebne medicinske potrebe. Za oralnu primjenu.

Visokokalorična, visokoproteinska, nutritivno kompletna tekuća hrana s dodanom EPA*, vlaknima i srednje- lančanim trigliceridima (MCT).

Za dijetalnu prehranu onkoloških bolesnika s prekaheksijom ili kaheksijom.

* eikozapentaenska kiselina, omega-3 masna kiselina iz ribljeg ulja



SAMO ZA ZDRAVSTVENE RADNIKE. Detaljne informacije dostupne su na Belupovim internetskim stranicama-www.belupo.hr ili ih možete dobiti od stručnog suradnika Belupa. Tiskano u Hrvatskoj 2019. (A 09 15).



POSTER SECTION	POSTER CODE	TITLE
	JZ05	Consumers' awareness of their role in food hygiene practice after the purchase of food
	JZ06	Dietary intake in children and adolescents attending primary and secondary schools in Zagreb estimated by 3-day food dietary record
	JZ07	Lifestyle program for improving pregnancy outcomes in women with obesity – slovenian pilot study
	JZ08	Nutritive profiling of lunch meals in primary schools in Zagreb municipality with nutrient rich food 9.3 index
GENERAL TOPICS	OP01	Differences in dietary habits among medical and non-medical faculties in Novi Sad
	OP02	Is there an association between pastries consumption frequency and body mass index in adults?
SPORT NUTRITION	SP01	Frequency of physical activity to children age 11-14 in relation to status of nutrition and food habits

SOCIAL EVENTS

Oeno-gastro event – Restaurant Fontana

Friday, 8th November, 20.00-24.00 pm

We invite You to join us for an enjoyable evening at Oeno-gastro event with rich assortment by Vindija, desserts from pastry shop Cukeraj and excellent TRS Ilok wine offer. Elegant atmosphere will be infused by live piano music. Don't miss an opportunity to meet your colleagues in a relaxed setting!

Gala dinner – Hall A&B

Saturday, 9th November, 20.00 pm - 02.00 am

Saturday you are guaranteed to immerse yourself in the very best Gala dinner Powered by Pik Vrbovec. As for the entertainment DJ will make sure you dance the night away... all in BLACK & WHITE dress code.

We look forward to seeing you.



**BLACK
AND
WHITE**

STUDENT SECTION

	Event / Događanje	Lecturer / Predavač	Hall / Dvorana
13:00 - 14:00	Student registration / Registracija studenata		
14:00 - 14:45 Grupa A	Student workshop I - Psychological approach to a patient	Latinka Basara, PhD	Zagreb
15:00 - 15:45 Grupa B	Studentska radionica I - Psihološki pristup pacijentu		
16:00 - 16:45 Grupa C	Chair: Margita Zlatić, MSc		
14:00 - 14:45 Grupa B	Student workshop II - Enterpreneuership in nutritionism	Ivana Barišić, MSc	Opatija / Pula
15:00 - 15:45 Grupa C	Studentska radionica II - Poduzetništvo u nutricionizmu		
16:00 - 16:45 Grupa A	Chair: Martina Žitnik, MSc		
14:00 - 14:45 Grupa C	Student workshop III - Case study: Obesity in paediatrics (treatment approaches models of obesity in children and adolescents through case study)	Sara Sila, MSc	Split / Dubrovnik
15:00 - 15:45 Grupa A	Studentska radionica III - Case study: Debljina u pedijatriji (modeli pristupa liječenju debljine u djece i adolescenata kroz case study)		
16:00 - 16:45 Grupa B	Chair: Ela Kolak, MSc		

Dragi studenti,

prijavili ste se na radionice koje su dio studentskog edukacijskog programa 7. Međunarodnog kongresa nutricionista, molimo da pročitate navedene upute. Prilikom registracije biti ćete podijeljeni u tri grupe (A, B, C) te ćete pohađati sve tri radionice u razdoblju od 14:00 do 16:45h. Između svake radionice imati ćete pauzu u trajanju od 15 minuta. Nakon svake radionice dobiti ćete test u prostoriji u kojoj ste pohađali radionicu. Certifikate ćete dobiti putem e-maila.

Kolegice i kolege, molimo Vas da pratite raspored radionica s obzirom na grupu kojoj pripadate. Vaša kontakt osoba je Martina Žitnik, mag.nutr.

HRAŃJIVO, ali i ukusno



NOVO!





Najbolje iz prirode. Najbolje za prirodu.

8th November 2019

This year, the program of the 7th International Congress of Nutritionists also includes a full-day workshop / excursion to the HiPP baby food factory in Glin, organized by HiPP Croatia. You have the unique opportunity to meet the entire team of experts who will bring you closer to the value of the HiPP company through a factory tour and a presentation on product quality and sustainability.

In addition to the presentation on product quality, there will also be a presentation on sustainable development. The importance of this presentation is also evidenced by the numerous awards and honors received

by Dr. Claus Hipp for the superior quality of HiPP products and for his outstanding commitment to environmental protection and sustainability. An analytical and microbiology laboratory will also be visited.



Ove godine u Programu 7. Međunarodnog kongresa nutricionista je i cijelodnevna radionica/ izlet u tvornicu dječje hrane HiPP u Glini u organizaciji HiPP Croatia. Imate jedinstvenu mogućnost upoznati cijeli tim stručnjaka koji će Vam približiti vrijednosti HiPP kompanije kroz obilazak tvornice i prezentaciju o kvaliteti proizvoda i održivosti.

Osim prezentacije o kvaliteti proizvoda, predviđena je i prezentacija o održivom razvoju. O važnosti ove prezentacije govore i brojne nagrade i priznanja koje je dobio dr. Claus Hipp za vrhunsku kvalitetu HiPP proizvoda i za izvanrednu predanost zaštiti okoliša i održivosti. Također će se obići analitički i mikrobiološki laboratorij.

Chair: Marija Petras, MSC



STUDENT SECTION

🕒	Event / Događanje	Lecturer / Predavač	Hall / Dvorana
13:00 - 19:30	Registration / Registracija studenata		
16:15 - 16:45	Coffee break / Pauza za kavu		
17:00 - 18:00	Workshop I - Gluten free diet, communication with patients and the role of associations in the life of patients with celiac disease Radionica I - Bezglutenska prehrana i komunikacija s pacijentom i uloga Udruge Chair: Petra Viličnik, MSc	Amalija Jurjević Delišimunović, MSc	Split / Dubrovnik
17:00 - 18:00	Workshop II - Anthropometric measurements Radionica II - Antropometrijska mjerenja Chair: Anja Vukomanović, MSc	Josip Karuc, MSc	Opatija / Pula
17:00 - 18:00	Workshop III - Medicinal and aromatic plants promote good health and well-being Radionica III - Ljekovite i aromatične biljke promiču zdravlje i dobrobit Sponsored workshop – Kotany Chair: Ana Ilić, MSc	Asst. prof. Danijela Bursać Kovačević, PhD Jasmina Mati, culinary expert	Zagreb
16:15 - 16:45	Coffee break / Pauza za kavu		
18:30 - 19:30	Workshop IV - Obesity and motivation Radionica IV - Debljina i motivacija Chair: Sara Sila, MSc	Ana Kotzmuth, MSc	Split / Dubrovnik
18:30 - 19:30	Workshop V - Interpretation of the complete blood count (CBC) test Radionica V - Interpretacija testa kompletne krvne slike (KKS) Chair: Margita Zlatić, MSc	Irena Linarić, MSc	Opatija / Pula
18:30 - 19:30	Workshop VI - Food blogger Radionica VI - Food blogger Chair: Ana Ilić, MSc	Iva Finderle, MSc	Zagreb

Majčino mlijeko nevjerojatno je složeno s raznolikom mješavinom **prehrambenih i bioaktivnih sastojaka**

COMING SOON



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FORMULA**

Components*

HMOs

Lipids

Bacteria &
their
metabolites

*među ostalim komponentama

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*dugolančane polinezasićene masne kiseline

** kratkolančani oligosaharidi / dugolančani fruktooligosaharidi

VAŽNA OBAVIJEST. Dojenje je najbolji oblik prehrane za dojenče. Početna hrana za dojenčad pogodna je od rođenja kada dijete nije dojeno. Preporučuje se prije početka primjene bilo koje mliječne formule za dojenčad prethodno se posavjetovati s liječnikom ili zdravstvenim djelatnikom. **Samo za zdravstvene djelatnike - NIJE za distribuciju široj javnosti.**

9th November 2019

Satellit - Breakfast symposium

Plant based beverages in human diet

Sara Sila, MSc

You are welcome to join a served breakfast during which you can enjoy interesting lecture about nutritional and health aspects of plant milk beverages by AdeZ.

Chair: Karmen Matković Melki, MSc



9th November 2019

Satellit - Lunch symposium

Diabetes and role of enteral nutrition

Marija Petras, MSc

We are happy to welcome you to learn more about the role of enteral nutrition in diabetic patients! So don't miss Lunch symposium by Belupo!

Chair: Tena Niseteo, PhD



10th November 2019

Satellit - Breakfast symposium

Physical activity in the workplace

Zoran Pajić, MSc, Sports academy "Mali olimpijac"

Don't be sore! Learn how to exercise in the workplace during your workday, and be fit and healthy everyday! Powered by Health Lab!

Chair: Margita Zlatić, MSc

🕒	Event
08:00 - 17:00	Registration
🕒	Hall: Ballroom foyer
08:30 - 09:00	<i>Breakfast symposium: AdeZ</i> <i>Plant based beverages in human diet</i> Sara Sila, MSc Chair: Karmen Matković Melki, MSc
🕒	Hall: A & B
09:15 - 09:45	Opening ceremony Tena Niseteo, PhD Prof. Heiner Boeing, FENS Predstavnik Grad Zagreb Prof. Ivančica Delaš, PhD
09:45 - 11:00	Plenary session GUT MICROBIOTA AND HEALTH Chairs: Tena Niseteo, PhD Karmen Matković Melki, MSc
09:45 - 11:00	Gut Microbiota in Obesity and Undernutrition Assoc. prof. Jurica Žučko, PhD Assoc. prof. Antonio Starčević, PhD
11:00 - 11:30	Coffee break

🕒	Hall: A	Hall: B
11:30 - 14:00	PHYTOTHERAPEUTIC EFFECT OF FOOD Chairs: Marija Kindl, PhD Margita Zlatić, MSc	NUTRITION AND AUTOIMMUNE DISEASES Chairs: Assoc. prof. Mario Habek, MD, PhD Anja Vukomanović, MSc
11:30 - 11:55	Biological, nutritional and health aspects of spices Asst. prof. Jana Šic Žlabur, PhD	Multiple sclerosis Assoc. prof. Mario Habek, MD, PhD
11:55 - 12:20	“Super fruits” as a rich source of natural antioxidants Marija Kindl, PhD	Inflammatory bowel disease Tena Niseteo, PhD
12:20 - 12:45	Potential health benefits of polyphenols Prof. Verica Dragović Uzelac, PhD	Hashimoto’s thyroiditis – possibilities of nutritional interventions Karmen Matković Melki, MSc
12:45 - 13:10	Efficacy and safety of beta-glucan – current evidence base from clinical trials Asst. prof. Viljemka Bučević-Popović, PhD	Nutrition in psoriasis patients Tina Milavić, PhD
13:10 - 13:30	Medicinal plants for the digestive system <i>Sponsored lecture – Soria</i> Stribor Marković, PhD	10 minutes of Abbot science <i>Sponsored lecture – Abbot</i> Ivan Radoš, MSc

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godine



Najpopularniji



Prolječno
buđenje

🕒	Event	
13:30 – 14:30	Lunch break Hall: Restaurant Fontana & Kralj Tomislav	
🕒	Hall: A	
14:30 – 15:15	<i>Lunch symposium: Belupo</i> <i>Diabetes and role of enteral nutrition</i> Marija Petras, MSc Chair: Tena Niseteo, PhD	
🕒	Hall: A	Hall: B
15:30 – 17:30	FOOD WASTE AND SUSTAINABILITY Chairs: Marija Batinić Sermek, Msc Ivana Linardić, MSc	SPECIFIC NUTRITION IN CHILDREN ATHLETES Chairs: Assoc. prof. Irzada Taljić, PhD Ana Ilić, MSc
15:30 – 15:55	Food waste in Europe Biljana Borzan, MD	Nutrition knowledge in children and adolescent athletes Assoc. prof. Irzada Taljić
15:55 – 16:20	Sustainable FBDGS – some environmental considerations Christopher A Birt, FENS	Disordered eating (DE) and eating disorders (ED) in young athletes Prof. Edvin Dervišević, MD, PhD
16:20 – 16:45	National food waste prevention initiatives and EU framework Marija Batinić Sermek	Nutrition guidance for child and adolescent athletes in organized sports Prof. Almira Hadžović-Džuvo, MD, PhD

	Hall: A	Hall: B
16:45 - 17:10	Sustainability in food processing and food industry Prof. Anet Režek Jambrak, PhD	Body composition assessment in young athletes Asst. prof. Maroje Sorić, MD, PhD
17:10 - 17:35	A global learning approach to food waste in non-formal education Tanja Popović Filipović	Dietary supplement intake among professional young athletes Zrinka Šmuljić, MSc
17:40 - 18:00		Hydration and micronutrient needs for young athletes <i>Sponsored lecture – Jamnica plus d.o.o.</i> Josip Hadži - Boškov, MSc
18:05 - 19:00	Croatian Federation of Nutritional Associations Annual Meeting Members only Hall: Zagreb	

🕒	Event	
08:00 - 12:00	Registration	
🕒	Hall: Ballroom foyer	
08:15 - 09:00	Breakfast symposium: Health Lab Physical activity in the workplace Zoran Pajić, MSc Chair: Margita Zlatić, MSc	
🕒	Hall: A	Hall: B
09:15 - 11:00	TRENDS IN NUTRITION Chairs: Asst. prof. Martina Bituh, PhD Marija Petras, MSc	NUTRITION IN FERTILITY, PREGNANCY AND LACTATION Chairs: Asst. prof. Ulla Marton, MD, PhD Martina Žitnik, MSc
09:15 - 09:35	Raw food and Paleo diet Lidija Šoher, MSc	The role of nutrition in women reproductive health Asst. prof. Ulla Marton, MD, Ass. Prof.
09:35 - 09:55	Elimination diets Ivona Višekruna Džidić, MSc	Nutrition and male fertility Angela Heap, Nutritional Therapist
09:55 - 10:15	Chrono nutrition program Ana Gifing, MD	Supplementation in pregnancy Maja Obrovac Glišić, MSc
10:15 - 10:35	Basic principles in ayurvedic nutrition/ ayurvedic nutrition in prevention and cure Irena Švenda, MSc	Nutrition and supplementation during lactation Prof. Ines Panjkota Krbavčić, PhD
10:35 - 10:55	Intermittent fasting Asst. prof. Martina Bituh, PhD	Postbiotics and HMOs in infant formulas Sponsored lecture – Aptamil Sara Sila, MSc

MOŽEŠ LI SVOM TIJELU OSIGURATI MAGNEZIJ SVAKOG DANA?

**Neki
Mogu
Sve.**



1l ≈ 1dan

Magnezij doprinosi:

- + stvaranju energije
- + normalnoj funkciji mišića

10:55 - 11:45	Brunch break
	Event Hall: B
11:45 - 12:15	ORAL PRESENTATION OF 5 BEST POSTERS Chairs: Ela Kolak, MSc Petra Viličnik, MSc
12:15 - 13:15	Panel powered by PBZ Food choice and Consumer behavior - brain and nutrition Guests: psychology, sociology, marketing (industry), sensory analysis Olivera Međugorac, Assoc. prof. Marina Krpan, PhD; Andrijana Mušura Gabor, PhD, Ines Bertinovec Chair: Nataša Andraković, MSc
13:15 - 14:55	CLINICAL NUTRITION IN PRACTICE: DIET THERAPY IN FUNCTIONAL GASTROINTESTINAL DISORDERS Chairs: Irena Martinis, MSc Matea Cigić, MSc
13:15 - 13:40	Irritable bowel syndrome (IBS) Assoc. prof. Darija Vranešić Bender, PhD
13:40 - 14:05	Nutritional care in dyspepsia and gastroesophageal reflux disease Irena Martinis, MSc
14:05 - 14:30	Constipation Tihomir Kekez, MD, PhD
14:30 - 14:55	Effect of magnesium bicarbonate rich water Mg Mivela on high normal and hypertension grade 1 blood pressure <i>Sponsored lecture – Jamnica plus d.o.o.</i> Mašenjka Katić, MSc
14:55 - 15:35	Award ceremony and Congress closure

HIPP

Najbolje iz prirode.
Najbolje za prirodu.



**Nije samo trend...
To je stil života!**

Stefan Hipp



hipp.com/hcp

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1. WORKSHOP ABSTRACTS

PSYCHOLOGICAL APPROACH TO A PATIENT

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Abstract:

Approaching a patient is a very important part of the patient-professional relationship because it determines the partnership and patient's adherence to a suggested treatment/regimen. In its essence, nutritionists are trying to motivate a behavioral change in patients which can be a complex task. Just because a patient is asking for help it doesn't mean that he/she actually is ready to make the crucial changes. On the other hand, patients seeking nutritional help often find themselves stigmatized by other medical professionals and it is up to nutritionists to modify and restore the confidence of the patient. This is an important step in overall behavior modification and patient's motivation to accept the suggested dietary implementations. The right approach has to include the right communications skills that enable building a relationship with the patients. Verbal and non-verbal signals can be strong stepping stones in the process of reaching set goals and most importantly - they can be acquired through practice. Empathy and motivational interviewing is crucial to the process because it transmits the message of importance and friendly advice versus intrusive „must“ messages that patients often hear. Good communication skills can create a positive environment in which patients actually want to change their habits and see the value behind it. Those skills include open-ended questions, active listening, patient-centered approach aiming at exploring and resolving ambivalence and really understanding the background of the patient's problems. Behavioral change always has to include education but motivation for change has to be elicited from the patients, not professionals. Removing the pressure of „shoulds“ and „musts“ can alleviate the desire to change and/or acquire new behaviors.

Keywords: psychological approach, motivation, adherence, relationship

ENTREPRENEURSHIP IN NUTRITIONISM

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Abstract:

Nowadays, having in mind today's way of life, an increasing importance is given to a proper "healthy" diet. In a multitude of information, tips, education, various marketing and sales tricks the main question arise – how to choose the right path? Nutritionism becomes profession of the future - global trends and challenges of such a «healthy lifestyle» are getting bigger.

Healthy diet is a buzz word of many healthcare professionals: doctors, pharmacists, kinesiologists, psychologists ... but individualized guidelines on proper diet and nutrition, development of individual nutrition program, for healthy or sick, athletes, teams, etc. is a job of academically educated nutritionist or the whole nutritionist team. Today, behind quality nutritionism, there is a whole team of people with certain knowledge, experience and skills, and the whole back office. Nowadays, being a nutritionist and entrepreneur at the same time emphasize a need of multidisciplinary approach that includes the knowledge and skills of the primary profession and continuous tracking of trends, knowledge and skills of entrepreneurship (management solutions).

Entrepreneurship requires capital, knowledge, skills, networking and research of market needs with the aim of developing new products, placing them on the market and creating supply and demand for customers/clients with the ultimate goal – gaining profit.

Today, entrepreneurship in nutritionism requires team of professionals from all domains mentioned above.

The biggest challenges of entrepreneurship in nutritionism in Croatia are:

- Raise awareness on the need for a nutrition service - health care as an investment into the future
- Position on quality, knowledge and experience in the health care segment having in mind competition from multiple segments in Croatia

Keywords: Entrepreneurship, brand, marketing, sales, nutritionism

CASE STUDY: OBESITY IN PAEDIATRICS

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Abstract:

Traditionally, clinical recommendations for diagnosing and treatment of obesity in children and adolescents rely on anthropometric measures such as the BMI, BMI percentiles or BMI z-score, and are used to monitor health risks and evaluate the success of obesity treatment. However, anthropometric measures alone are not accurate and reliable measure for the identification of children and adolescents with health risks or comorbidities associated with obesity.

In 2016, a group of experts from Canada proposed a new system of clinical assessment of obesity, called Edmonton Obesity Staging System for Pediatrics (EOSS-P). EOSS-P is a shift from obesity diagnosis based exclusively on BMI, as it takes into account other factors associated with obesity. EOSS-P is used for stratification of patients according to the severity of comorbidity, and classifies them into four categories (Stage 0 to Stage 3) within four main health domains: metabolic, mechanical, mental health and social milieu. Given the estimated stage of obesity, it is decided how the child should be treated (primary health care level, primary health care level + dietitian, multidisciplinary approach).

Nutritionist/dietitians are most commonly involved in obesity management as an integral part of multidisciplinary team, and as such are usually treating children at the Stage 1 or 2 according to EOSS-P. It has been shown that multidisciplinary approach that includes the whole family has the best long-term results in obesity treatment.

At this workshop, students will learn how to use holistic approach in obesity diagnosis and management. Furthermore, through 4 different case studies, they will learn to use EOSS-P as a tool for assessing the stage of obesity in children and to decide on further treatment steps. Since nutritionists/dietitians are important part of multidisciplinary team for treatment of obesity, multidisciplinary approach that includes the whole family will be explained in detail.

Keywords: obesity, children, adolescents, treatment, multidisciplinary team

GLUTEN FREE DIET, COMMUNICATION WITH PATIENTS AND THE ROLE OF ASSOCIATIONS IN THE LIFE OF PATIENTS WITH CELIAC DISEASE

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Abstract:

Celiac disease (CD) is an immune mediated systemic disease caused by gluten and occurs in persons with an inherited tendency for developing the disease. It occurs as a result of the interaction between environmental factors and genetic predisposition, but all the details of this disease are still not fully understood.

A strict, lifelong gluten-free diet is currently the only therapy for this disease, and the fact that it lasts for a lifetime and requires an uncompromising diet regime makes it particularly demanding. Failure to maintain a gluten-free diet can result not only in the presence of the symptoms, but also in the development of non-malignant and malignant complications. The maintenance, therefore, of a lifelong gluten-free diet is unquestionable. According to research, the percentage of patients who adhere to a strict gluten-free diet range from 40% to 88%. From this, it is clear that further efforts are needed in educating patients about the importance of following a strict gluten-free diet.

Celiac associations should have a significant role in a patient's life, especially in the case of those newly diagnosed. These associations can provide patients/members with the ability to independently and successfully manage a strict gluten-free diet, preserve and maintain their own health and prevent complications resulting from the illness. They can also help patients to more easily accept in less time the diagnosis of CD, cope with all aspects of it, and support them as far as possible in leading a fulfilling life despite the disease.

Associations, led mainly by volunteers, help to increase the awareness of CD as a general health problem. Their members provide comprehensive support and the necessary tools to successfully overcome and maintain a proper gluten-free diet, as well as improve and preserve the overall health of those affected, including their family members. Valuable practical measures provided by the associations include: advice on how to properly implement a gluten-free diet and choose gluten-free groceries; raising awareness of the risk factors for complications; counselling about legal rights; organizing member meetings and cooking classes where practical knowledge in the preparation of gluten-free food is gained; organizing professional workshop and lectures; printing manuals and brochure; implementing child sensitization programs in kindergartens and schools and many other activities.

In summary, the implementation of a strict gluten-free diet requires not only a patient's persistence, self-discipline, regular medical supervision, nutritionist co-operation, but also the indispensable support provided by associations, family members and the community.

Keywords: celiac disease, gluten-free diet, associations, health

ANTHROPOMETRIC MEASUREMENTS

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Abstract:

The aim of this workshop is to acquire basic knowledge from the field of kinanthropometry, which will easily be incorporated in practice. Therefore, in this workshop, theoretical and practical basis of the anthropometric measurements will be presented. Also, measurement and interpretation of the most used anthropometric measurements in sport and clinical practice will be discussed. In addition, practical part of this workshop will be focused on the basic measurement skills acquisition. After that, practical part of workshop will include work in small groups with the emphasis on practical usage of instruments, measurements of the kinanthropometric dimensions and interpretation of the results. After the workshop, participants will be able to understand theoretical and practical basics of the measurements and will be able to implement acquired knowledge into their practice.

Keywords: kinanthropometry, morphology, body composition

MEDICINAL AND AROMATIC PLANTS PROMOTE GOOD HEALTH AND WELL-BEING

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Abstract:

Medicinal and aromatic plants (MAPs), also known as herbs or spices, are important condiments for traditional cuisine all over the world and the oldest known health care products in folk medicine, mainly due to their valuable constituents such as bioactive compounds and essential oils. The content of these active compounds is very important when valorising a potential of MAP, therefore modern non-thermal techniques for green extraction procedures are currently explored in order to obtain highly valued extracts that may have many applications. It is estimated that about 4,000 to 6,000 MAPs are of commercial importance. In Republic of Croatia the most important is consumption of Mediterranean herbs such as rosemary (*Rosmarinus officinalis* L.), sage (*Salvia officinalis* L.), oregano (*Origanum vulgare*), thyme (*Thymus vulgaris* L.) and others that have been associated with numerous health benefits. Numerous studies have reported the use of rosemary extracts/essential oils as a natural food biopreservative therefore The European Commission approved the use of rosemary extracts as a new food additive under label E392. Moreover, it has been shown that sage extract had a higher level of phenolic compounds than rosemary extract, but lower antioxidant capacity than the rosemary extract. Sage essential oils possess antioxidant, antibacterial, insecticidal, and allelopathic properties, hence might be used in human healthy and food industry. For oregano it was found to contain the highest polyphenolic content in comparison to 27 culinary and 12 medicinal herbs evaluated. Thyme has a pleasant scent due to high content of essential oils and is highly recommended as home remedy for the treatments of variety of diseases such as gastroenteric and bronchopulmonary disorders. The potential of „green extraction“ procedures by means of high voltage electrical discharge (HVED) and green solvents from Croatian autochthonous Mediterranean herbs (olive leaf, rosemary, sage, oregano, thyme, wild thyme, olive leaves) is well explored by GREENVOLTEX project (IP-2016-06-1913), whereas obtained results should find their practical use in SMEs and food industry.

Keywords: Medicinal and aromatic plants, Mediterranean herbs, green extraction, bioactive compounds, essential oil, extract

OBESITY AND MOTIVATION

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Abstract:

Medically trained authors state that obesity is a chronic disease and a sort of a modern age threat due to lack of symptoms, but has, on the other hand, strong associations with various, life-threatening conditions such as heart diseases and cardiovascular diseases. Variable individual integration of social, behavioral, cultural, psychological, metabolic, and genetic factors generates obesity in its final, clinical form (Vrhovec, Jakšić, Reiner and Vucelić 2008, according to Ružić and Peršić). There are numerous reasons and factors from the environment as well as from hereditary genetics that affect the occurrence of obesity. This makes obesity treatment extremely difficult and long-lasting, and in many cases even unsuccessful. Experiencing failure has a negative effect on the sense of self-efficiency, and it consequently undermines motivation.

Taking into account the inseparability of psychological factors with obesity problems, it is necessary to familiarize the people in the therapeutic weight loss process with the need for a lifestyle change. Knowing the phases in a lifestyle change increases the likelihood of a successful weight loss and staying in the same weight. Single treatments like diets turn ineffective due to a quick slip back into old eating habits, inadequate challenge management, and loss of self-control or inadequate delay in satisfying habits. In this workshop, the participants will learn the stages of a lifestyle change according to Prochaska and DiClemente's Transtheoretical Model of behavior change from 1977. After that, they will try to answer questions related to the contemplation stage taking into consideration a small diet change they would like to introduce in their lives.

The sense of greater self-efficiency and knowing the stages of the process can increase one's motivation and the likelihood of reducing obesity in those individuals who have unsuccessfully started the weight-loss process themselves many times.

Keywords: weight, motivation, transtheoretical model, change, self-efficiency

INTERPRETATION OF THE COMPLETE BLOOD COUNT (CBC) TEST

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Abstract:

Laboratory diagnostics is a medical discipline playing an important part in patient management. Objectives of diagnostic investigations include detecting or excluding disease; contributing to patient management; assessing prognosis; monitoring clinical course; and measuring general health or fitness. Diagnostic tests range from the signs and symptoms obtained from the patient's history and physical examination to the sophisticated laboratory tests widely used in medical practice today. Tests generate information and that information, either by itself or in context with other test results and elements from patient history and physical examination, is valued for itself, not only for its implications for the management. When we feel ill, we would usually like to know why it happened and when we will get better. In that case how useful can evaluation of complete blood count (CBC) be? What is a CBC? Why and when to get tested? The CBC is one of the most common laboratory tests performed today. The basic investigation is the automated complete blood count which represents a profile of tests provided by hematology analyzers. The CBC of modern hematology analyzers consists of the following parameters: hemoglobin (Hb), white blood cell (WBC) count, red blood cell (RBC) count, hematocrit (HCT), mean cell volume of red cells (MCV), mean cell hemoglobin content of red cells (MCH), mean cell hemoglobin concentration of red cells (MCHC), platelet (PLT) count, red cell distribution width (RDW), mean platelet volume (MPV), differential leukocyte count (DLC). The CBC is often used as a broad screening test to determine an individual's general health status: help diagnose various conditions such as anemia, infection, inflammation, bleeding disorder, leukemia; monitor the condition and/or effectiveness of treatment after a diagnosis is established; monitor treatment that is known to affect blood cells such as chemotherapy or radiation therapy.

Daily laboratory activity is an essential part of the comprehensive patient care, and consists of various actions that should be optimized and standardized to provide laboratory reports that might be ultimately useful for the clinical decision making.

Keywords: diagnostic tests, complete blood count (CBC)

FOOD SCIENCE AND FOOD BLOGGING - IS THERE A CONNECTION?

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Abstract:

Social networks have become the fastest growing global trend of communication easily reaching the target population so they are an excellent channel for promoting a healthy lifestyle. The biggest advantages given by social networks, primarily Facebook and Instagram are: the two-way communication between you and an existing and/or a potential follower and the freedom to express ones opinion so the desired information reaches the targeted audience in the shortest possible time.

Giving the proper importance to the up to date trends, food blogging is one of the most appropriate tools nutritionists can use because it allows an approach to their target population in a simpler way introducing, what usually seems complex, in understandable manner.

In a food blogging field, as a nutritionist wants to educate the population, he has to attract the public's attention knowing already what is the message he wants to convey, why is he doing it and in which area is he the most competent.

The goal of this workshop is to bring social networks, food blogging and food science closer in order to create the next channel to educate about healthy lifestyle.

Keywords: social networks, food blogging, motivation, healthy lifestyle

2. LECTURE ABSTRACTS

NATIONAL FOOD WASTE PREVENTION INITIATIVES AND EU FRAMEWORK

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Abstract:

In the EU, around 88 million tons of food waste are generated annually with associated costs estimated at 143 billion Euros. The EU and the EU countries are committed to meeting the Sustainable Development Goal 12.3 target to halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains.

The Revised EU Waste Legislation, adopted on 30 May 2018 calls on the EU countries to take action to reduce food waste at each stage of the food supply chain, monitor food waste levels and report back regarding progress made and all this by using a common EU methodology to measure food waste. At the EU level acts EU Platform on Food Losses and Food Waste as a multi-stakeholder platform involving both EU countries and actors in the food chain in order to help define measures needed to achieve the food waste SDG, facilitate inter-sector co-operation, and share best practice and results achieved.

At national level, food waste prevention strategy is endorsed in Plan for food waste prevention and reduction of Republic of Croatia (2019-2022) which identifies key food prevention measures across the whole food supply chain. Priority measure is the improvement of food donation system. To this regard, Ministry of Agriculture has developed a digital platform for food donation in order to facilitate and promote food donations and is currently conducting a Feasibility study on Food Bank in Croatia. Other measures include development of sectorial guidelines encouraging the reduction of food waste at all levels of the food chain, promoting social responsibility, conducting campaigns for raising consumer's awareness, education of children, improving the food waste measurement frame and investing in research and innovative food waste prevention solutions.

Keywords: food waste, EU and national policies, food donation

INTERMITTENT FASTING

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Abstract:

During the last decade intermittent fasting drew great attention of both public and scientific community as a strategy for weight management. Intermittent fasting is a diet regiment characterized by cycles between the periods of fasting and periods of unrestricted eating. There are a number of intermittent fasting patterns to describe this dietary treatment approaches such as 5:2 diet, alternate day fasting, periodic fasting or intermittent energy restriction. They all have in common the periods of fasting during which the energy intake is severely restricted, ranging from complete abstinence from food to a daily maximum intake roughly corresponding to 75% energy restriction as well as the periods of *ad libitum* eating. These eating regiments, beside potential interest to manage obesity, are in the focus due to potential health effects (influence on biomarkers and cardiovascular risk factors) and anticancer effects, including longevity which has been shown in animal studies. The aim of this lecture will be to provide an overview of intermittent fasting regimens and summarize the evidence on health benefits or adverse effects of intermittent fasting with a focus on human intervention studies. This lectures will also address conditions that should abstain from intermittent fasting and arise some important questions and concern.

Keywords: intermittent fasting, energy restriction, periodic fasting

EFFICACY AND SAFETY OF BETA-GLUCAN – CURRENT EVIDENCE BASE FROM CLINICAL TRIALS

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Abstract:

Beta-glucans are polysaccharides widely found in bacteria, fungi, algae, and plants that are sold and advertised as biologically active compounds, with various health claims. They are commonly recommended for their presumed cholesterol-lowering effect and the effect on postprandial blood glucose. It has also been reported that beta-glucans boost the immune system, thereby providing resistance against infections or cancer development. With the increasing number of studies reporting clinical trials with beta-glucans, it is a challenge for clinicians and nutrition experts to keep up with the literature. The lecture will give an overview of beta-glucan biological activities and present the results of systematic review undertaken to summarize the results about efficacy and safety of commercial oral and inhalation beta-glucan products. The systematic review included any commercial product, any types of participants and any health-related outcomes that was investigated in randomized controlled clinical trial (RCT). After searching MEDLINE, CENTRAL and ClinicalTrials.gov databases, 30 RCT were included in the final analysis. Most of the trials reported beneficial effect of beta-glucan, but among the 105 different outcome domains and measures that were used, only three could be considered clinically relevant, while others were various biomarkers and surrogate outcomes such as complete blood count. Included studies on average had 33 participants per study arm, high or unclear risk of bias of at least one domain, and only half of them reported data for safety. More than half of trials that reported source of funding indicated commercial sponsorship from producers of beta-glucan. Only five RCTs reported trial registration. In conclusion, the findings of these trials may be considered only as preliminary, as they used small number of participants and surrogate outcomes. The quality of many studies was poor and further research and trials on bigger population should be performed before a final conclusion can be made.

Keywords: beta-glucan, bioactivity, randomized controlled trial

DISORDERED EATING (DE) AND EATING DISORDERS (ED) IN YOUNG ATHLETES

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Abstract:

DE/ED are some of the most prevalent disorders in adolescence. Higher prevalence of DE/ED was reported in athletes than in non-athletes, where esthetic sports and sports with weight categories are most at risk. During accelerated body development in puberty the total daily energy demands highly increases and matching energy intake with energy expenditure is of crucial importance to support growth, achieve good health and academic achievements. In trained youth athletes this problem becomes even bigger, as due to high sports related (training and competition) energy expenditure the relative energy deficiency (RED) may occur. This is a condition in which low energy availability is due to the fact that energy that remains after subtracting sports related expenditure from daily energy intake is not enough to support basic physiological functions.

The consequences of RED have effect on athlete's health (impaired immunological response, poor bone health, impaired iron metabolism with anemia, menstrual dysfunctions, metabolic and endocrine changes, changes in cardio-respiratory responses to exercise, etc.) and sport performance (depleted glycogen stores, inappropriate training response with signs of over-reaching and overtraining, increased injury risk, strength, power and endurance decrements with impaired concentration, coordination, and judgement, accompanied with anxious-depressive mood changes). Monitoring energy availability in young athletes is therefore necessary to prevent such conditions and intervene as soon as signs and symptoms occur. Furthermore, to prevent DE/ED it is important to provide optimal macronutrient and micronutrient intake, as well as maintain proper hydration. We are discouraging any unsupervised supplementation in these population, unless there is clear medical indication for it. Education of young athletes, their parents and coaches is of crucial importance to prevent DE/ED and develop healthy nutrition habits that will help them preserve health and improve performance. Individual nutrition periodization is necessary for highly trained young athletes.

Keywords: adolescence, relative energy deficiency, nutrition, periodization

POTENTIAL HEALTH BENEFITS OF POLYPHENOLS

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Abstract:

Polyphenols are secondary metabolites most commonly found in various types of plants and they represent an important component of human nutrition. The main classes of polyphenols include phenolic acids, flavonoids, stilbenes and lignans, and they differ according to the chemical structure, biological and pharmacokinetic properties etc. Natural sources such as fruit, vegetables, cereals and their various different products (fruit juices, tea, wine, infusions, etc.) contain complex mixtures of polyphenols and their content depends on numerous factors (plant type, variety, maturity, environmental factors, storage). Recent research trends have identified that certain dietary polyphenols are recognized as health-promoting agents, due to their ability to act as antioxidants and free radical scavengers as well as chelators of prooxidative metals such as copper and iron. Apart from the antioxidant properties of polyphenols, their bioactivity is the result of various other complex mechanisms of action such as inhibition of different enzymes, receptor modulations and interference with cell signalling pathways.

Many epidemiological studies have suggested that long-term consumption of food rich in dietary polyphenols provides potential protection against the development of cardiovascular diseases, cancer, diabetes, osteoporosis, neurodegenerative diseases and many other chronic diseases. Anti-carcinogenic activity of polyphenols occurs through chelation by removing cancerous molecules, modulating cancer cell signalling and cell cycle progression, inducing different enzymes activities and stimulating apoptosis.

In the prevention of cardiovascular disease, polyphenols act to improve blood circulation by lowering plasma cholesterol and free fatty acids. To achieve protective effects, polyphenols must be bioavailable to organisms and their bioavailability is diverse among them and depends on their structure and metabolic reactions. Generally, aglycones can be absorbed from the small intestine; however, most polyphenols are present in food in the form of esters, glycosides or complex polymers that must be hydrolysed by intestinal enzymes or by colon microflora prior to absorption. There is no clear relation between the amount of polyphenols in food and their bioavailability in the human body. Therefore, this paper focuses on understanding the efficiency of polyphenols as bioactive molecules on improving human health and prevention of various diseases.

Keywords: polyphenols, antioxidants, free radical scavengers, chelators of prooxidative metals, bioavailability, health benefits

CHRONONUTRITION PROGRAM BY DR GIFING®

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Abstract:

Obesity, metabolic syndrom, hyperlipidemia, Diabetes Mellitus II, etc, are completely treatable conditions today. These conditions have been associated with coronary arteries disease and many other diseases that could be prevented. Besides some enviromental and stress factors, modern life style with very little physical activities and many bad eating habits with bad food sources made huge number of sick children and adults.

In this study several parameters were assessed in our 1,538 male patients, average 39.40 years old. During the period of three months we tested every 30 days next: total weight, sceletal muscle mass, total body fat, body mass index (BMI), total cholesterole, HDL, LDL, tryglicerides and fasting blood sugar. All patients were on Chrononutrition program by dr Gifing®. This diet is completely phisiologycal program of nutrition with no calory restriction and circadial rhytm respective. Important is to take three meals during day, and to avoid during first month all dairy products, fruits and all kind of sugars. Breakfast is obligatory. It is important to combine food during the lunch and dinner, meaning not to take in the same meal starch food and proteins. In the evening it is important not to eat starch food at all. Between meals there is a break about four to five hours.

First visit measures showed average BMI 32.19, average weight 98.12 kg, body fat mass 44.92 kg, total cholesterol 5.99 mmol/L, blood sugar 6.16 mmol/L. After three months, results showed statistically significant difference between first and last testing. Chrononutrition program dr Gifing® is easy to practise, beneficial for everyone and higly effective. In short period of time we can see results in treating obesity and metabolic syndrom. This nutritional program is preventive for various disease risk factors, especially for cardiovascular diseases, it showes also great results while treating patients once when diseases appear.

Keywords: Obesity, Hyperlipidemia, Diabetes

NUTRITION GUIDANCE FOR CHILD AND ADOLESCENT ATHLETES IN ORGANIZED SPORTS

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Abstract:

Benefits of regular physical activity during period of the childhood and adolescence has been known for a long time. Increased energy demands, caused by growth and development are further enhanced with increased physical activity, especially during puberty. For nutritionists this is a special challenge, which often requires a multidisciplinary approach, in which parents and trainers play a significant role. The need for adequate energy input is necessary to ensure proper growth and development. Lack of energy results in inadequate recovery, poor quality of training, menstrual dysfunctions, slow growth and development, while excessive intake at the same time is a risk factor for obesity, diabetes, and metabolic syndrome. The latest statistics data show a significant increase in the number of children and adolescents involved in organized forms of sports activities, while at the same time numerous studies showed that obesity is a world epidemiological problem at the same age. Importance in determining total daily caloric intake in these age groups has the following factors: age and gender, intensity and duration of training (day/total time), and athlete's fitness and body composition level, as well as their energy demands later in the day or in the subsequent days.

Carbohydrates are the primary energy fuel for exercise and the recommended intake is 4-6 grams per kilogram body mass each day. Recommended protein intake in active children and adolescents is higher than the average for sedentary population of the same age and gender, with averages intake of about 1.2 to 1.8 g protein per kilogram of body mass per day. When planning a diet plan a significant role of fat should not be disregard, especially as a hormonal substrate, and various fat must be an integral part of adequate nutrition plan. Fluid intake and hydration are important considerations for young athletes. The role of micronutrients (minerals and vitamins) in the growth and development during childhood and adolescence gives them a significantly greater importance in nutrition than in adults. Finally, the increasing use of supplements, especially in adolescents, emphasize the importance of proper nutrition guidance that will fully ensure healthy growth and development followed by great sports results.

Keywords: guidelines, nutrition, sport, children, adolescents

CONSTIPATION

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Abstract:

Constipation or obstipation is one of the most common hardships of the human nation which affects every third person, older than 65. Not only the general population, but the health officials too, define constipation only as the absence of stool. Therefore, it is important to know Roman criteria III about the definition of constipation which was formed by gastroenterologists. Apart from that, they described the primary and secondary constipation. Primary constipation is a consequence of inadequate work of the colon and is divided into three groups: constipation with a normal transit time, constipation with a slower transit time and the defecation dyssynergia. Secondary constipation is a consequence of taking medicines or an emergence of illness which both slow down colon's function.

In the medical guidelines on how to treat obstipation, an increased dietary fiber and water intake is recommended as the first step of the treatment. The fibers increase the stool's volume and by doing so accelerate the passage of contents through the intestine in a physiological way. Unfortunately, in Croatia, that is not the first step in treatment, it is the stimulative laxatives. Hence why it is very important to know what kind of constipation the patient has because dietary fibers and water won't help with all forms of constipation. That way, the number of people who start the constipation treatment with fibers as the guidelines suggest, is decreasing even more.

The regulations of the European Union strictly define what dietary fibers are and divides them into three categories: edible polymers which are naturally present in food, edible polymers which are obtained from raw food and edible synthetic polymers of carbohydrates. According to the EU regulations, food can have nutritional or health claims, but cannot have therapeutical claims as medicines do. Food which has a sufficient amount of dietary fibers and a sufficient number of studies about the effectiveness of health claims about digestion includes: wheat bran, rye, barley, oats and dry prunes. Flax doesn't have enough studies about efficiency, hence why it cannot have health claims. From polymers obtained from raw food, the most famous one is psyllium which has the highest number of efficiency studies about digestion. Some of those proven claims are therapeutic, but they cannot be used in the segment of food additives.

Keywords: constipation, transit time, dietary fibers, psyllium

“SUPER FRUITS” AS A RICH SOURCE OF NATURAL ANTIOXIDANTS

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Abstract:

The term “super fruits” has gained increasing attention and importance in recent years connected with the marketing strategy to promote the extraordinary health benefits of some fruits. Their use is associated with the prevention and treatment of numerous health problems and illnesses such as cardiovascular and inflammatory diseases, cancer, metabolic syndrome, obesity and diabetes as well as aging processes. As a rich source of nutrients and other bioactive ingredients, super fruits can be used as functional food and/or food supplements. The market of products containing super fruits is continually growing because of their increased usage associated with today's lifestyle. Consequently, all this has led to many studies aiming to identify the bioactive constituents and evaluate biological activities of the so called super fruits. The aim of this lecture is to give an overview of the phytochemical composition and potential health benefits of some commonly used super fruits such as aronia, bilberry, pomegranate, acai and goji. These berries present a valuable source of various secondary plant metabolites (anthocyanins, phenolic acids, flavonoids, tannins, carotenoids, lipids and polysaccharides) with proven antioxidant activity. Oxidative stress, as an imbalance between the production of reactive species and antioxidant defences, plays a critical role in the onset and development of many diseases facing the modern world. Therefore, acting as powerful antioxidants, super fruits have a prophylactic and therapeutic potential in the management of various chronic diseases. Besides having antioxidant activities, the phytochemicals from super fruits show many other biological effects as well. The accumulated preclinical evidence pointed out on their great therapeutic potential but clinical research of super fruits in order to confirm their positive impact on human health is still needed.

Keywords: super fruits, phytochemicals, antioxidants, health benefits

NUTRITIONAL CARE IN DYSPEPSIA AND GASTROESOPHAGEAL REFLUX DISEASE

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Abstract:

Gastroesophageal reflux disease (GERD) is increasingly prevalent worldwide, particularly in the Western world, where reflux symptoms have a prevalence of up to 40% in population-based studies. Approximately 20%–30% of the general population presents with dyspepsia which has not been investigated.

Symptoms of GERD can cause lifestyle disturbances by affecting patients' daily functioning and sleep, which may lead to a significant decrease in patients' quality of life measures. The increasing prevalence of GERD encouraged examination of food and dietary habits as a potential cause or exacerbating factor in the development of reflux symptoms. Although some evidence has suggested associations with certain foods (fats, fried foods, canned food and beverages) with reflux symptoms, objective evidence based data in this field remain unclear.

Worldwide studies on various populations show that risk factors for GERD include age, obesity, lifestyle factors (such as smoking, physical activity) and diet. Obese patients are over three times as likely to have hiatal hernias compared to non-obese individuals. Lifestyle modifications have long been paramount to the management of GERD. Reflux disease symptoms are associated with low consumption of dietary fiber, according to epidemiological studies. Patients with GERD and dyspepsia, more often than healthy subjects, ate: tomatoes and tomato products, citrus fruits and juices, chocolate and chocolate products, spicy or sour, coffee, dishes high in fat, carbonated beverages, and alcohol. Some of these products may have contributed to GERD and dyspepsia but also the frequency of eating them may play a role in causing/aggravating disease symptoms. In conclusion: Dietary modification is a proposed first-line therapy for patients with GERD and dyspepsia. It is very important to encourage patients to implement other lifestyle changes such as stopping smoking and weight reduction. Better knowledge with balanced lifestyle is an excellent treatment of GERD and dyspepsia.

Keywords: food intake, dyspepsia, GERD, dietary factors, diet

THE ROLE OF NUTRITION IN WOMEN REPRODUCTIVE HEALTH

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Abstract:

Over the last decade the relationship between nutrition, diet, life style and human fertility, women health in general has been greatly investigated, resulting in the identification of a few clear patterns. Promoting especially preconception health can potentially improve women's health and pregnancy outcomes. In last year's connection between nutrition during the pregnancy and the better life outcome has been put in the focus. Evidence based interventions exist to reduce many maternal behaviors and chronic conditions that are associated with adverse pregnancy outcomes such as drug, tobacco, nicotine and alcohol use, inadequate folic acid intake, obesity, hypertension, and diabetes. Intake of supplemental folic acid, particularly at doses higher than those recommended for the prevention of neural tube defects, has been consistently related to lower frequency of lower risk of pregnancy loss, infertility and greater success in infertility treatment, as well as weight reduction. Still there is an open question on absence or deficiency of vitamin D and his role in human fertility. Infertility is often associated with women ovulation failure; on another hand male physiological factors have been shown to be responsible for ~25% of cases. Antioxidant supplementation appears to be beneficial when it is male partner who is supplemented but it does not appear to offer any benefits to women undergoing infertility treatment. However, the available evidence does not allow discerning which specific antioxidants, or at which doses, are responsible for this benefit. Evidence suggests that nutrition, life style and diet can play an important role in altering fertility related outcomes in both men and women. Diets high in unsaturated fats, whole grains, vegetables, favoring seafood, fish, poultry, fruits, and vegetables are related to better fertility in women and better semen quality in men. Long-chain omega-3 fatty acids appear to improve female fertility, although it remains unclear to what extent contamination of shared food sources, such as fish with high levels of environmental toxicants, can dampen this benefit. Importance of weight regulation is the first-line therapy for infertility; is beneficial for metabolic/glycemic abnormalities and for improving menstrual irregularities and fertility outcomes.

Ongoing research in preconception health are needed to monitor the influence of improved health-care access and coverage on women's prepregnancy and interpregnancy health status, pregnancy and infant outcomes, and health disparities.

Keywords: women health, diet, nutrition. infertility, obesity and fertility

HASHIMOTO'S THYROIDITIS - POSSIBILITIES OF NUTRITIONAL INTERVENTIONS

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Abstract:

Hashimoto's disease or Hashimoto's thyroiditis (HT) is defined as chronic autoimmune thyroiditis, an organ-specific autoimmune disease characterized by lymphocytic infiltration of the thyroid gland and serum positive thyroid autoantibodies: thyroid peroxidase antibodies (TPO-Ab) and/or thyroglobulin antibodies (Tg-Ab). Recently, HT is considered the most common autoimmune thyroid disease mainly affecting women (10% - 20% regarding the age), and up to 5 times smaller ratio of men. Although many patients with HT in the beginning are euthyroid and asymptomatic, during time, there is an increase of symptoms despite thyroid hormone stability, which leads to the high prevalence of autoimmune hypothyroidism in adult population. It is estimated that HT causes 90% of hypothyroidism in iodine sufficient areas. The manifestations of HT are variable and most commonly include constipation, fatigue, dry skin and weight gain. Additional symptoms are cold intolerance, peripheral neuropathy, bradycardia, depressive symptoms, memory loss, muscle cramps, joint pain, hair loss, myxedema and many more. The treatment of HT related hypothyroidism is thyroid hormone replacement therapy, most commonly levothyroxine administered orally.

Regarding the supplementation or/and nutritional intervention for HT, current studies indicate no unified answer. For now, no official diethrapy protocol is recommended. Results of various studies show connection between HT and specific micronutrient intake and nutritional status. Low selenium and vitamin D levels have been reported as a risk factor for HT, as well as high iodine intake that might be involved in higher prevalence of autoimmune hypothyroidism in iodine-sufficient regions. Nutritional recommendations for HT still remain inconsistent. There is an increasing number of studies investigating the effect of gluten free diet, low FODMAP, autoimmune/anti-inflammatory protocols and Mediterranean diet as a prevention tool and complementary support in HT related hypothyroidism. These studies of nutritional interventions are focused mainly on decrease of symptoms and comorbidities that are often related to HT, such as non-celiac gluten sensitivity, irritable bowel syndrome and metabolic syndrome. Results of studies suggest that individual approach, personalised nutritional intervention and specific micronutritional supplementation could be promising complementary strategies in treatment of HT and related hypothyroidism.

Keywords: Hashimoto's thyroiditis, hypothyroidism, nutritional intervention, gluten-free diet, micronutrition

A GLOBAL LEARNING APPROACH TO FOOD WASTE IN NON-FORMAL EDUCATION

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Abstract:

Food waste has gained significant attention recently and is on political, scientific and civic agendas. It is acknowledged at the EU level, food waste 'has high social, economic and environmental costs, as well as ethical consequences' (EP, 2017, p. 3). In addition to the local food waste management problems, social inequality and deprived people, economic and environmental problems, global aspects of food wastage are of importance. Social burden and environmental impacts throughout whole food supply chains affect food producers and consumers all around the world. Especially socially vulnerable are people in developing countries in terms of hunger, food safety, inequality, low income, and human right impingements.

Households are a crucial target group, as they produce nearly half of the food waste. Also, youths are of importance, as young people generate more food waste and, at the same time, are going to shape local and global development in the near future. Thus, it is crucial for target groups not only to envision the world as one community but also to be able to find their role, responsibility, and involvement in coping with global issues. A number of factors influencing food waste generation need to be addressed. One of these is household food-related routines which are associated with food purchasing, processing, and consumption choices. Routines such as purchasing too much food during shopping trips could contribute to increased food waste. In addition, planning routines (e.g., a shopping list, meal planning) could influence shopping routines and result in less food cooked. Another factor is customers' intense focus on freshness. This means goods with extended shelf life often result in discards quite some time before the expiration date.

Misinterpretation of different labelling approaches also might result in food waste generation. In a study by Beck et al. half of the consumers interviewed interpreted 'best before' label as 'inedible after'.

Keywords: food waste, global learning, households, labelling

SUSTAINABILITY IN FOOD PROCESSING AND FOOD INDUSTRY

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Abstract:

Sustainable development, inaugurated by a series of national strategy documents and emphasized by European Union, requires the application of principles of the concept of sustainable development. It includes process management, public communication and the development of a new system of values in which environmental concerns occupy a significant place. In the food industry, rapid implementation of improvements in “eco-efficiency” or energy efficiency is required, whereas it is necessary to identify a wide range of (useful) natural materials by minimizing waste generation (zero waste).

In addition to the circular economy, the techniques, tools and methods used in sustainability assessments are needed. Besides knowledge of processes and technologies in food technology and biotechnology, sustainable tools are future necessity to be applied in order to provide strategic development of companies, product development and product system improvements, with good marketing positioning. It is important to consider and to apply advanced thermal and nonthermal (“green”, sustainable) processing techniques in biosciences, and to critically consider the advantages and disadvantages of certain techniques, which is in line with the Global Sustainable Development Goals (2030). Advantages of using advanced thermal and nonthermal techniques in sustainable development are visible through small gas emissions; through fast and efficient processes, low energy consumption, lower working temperatures, and efficient microbiological safety. Special emphasis is placed on the use of sustainable techniques in food technology, fermentation, biotechnological processes, by-products processing, etc., by implementing sustainable techniques in existing food processing lines. Along with the standard methodology of analysis, there are tools and concepts such as: Quality Function Deployment, Green Technology, Clean Label, Clean Processing and Production, Carbon Emission, Waste and Water Footprint, Zero Waste and Life Cycle Assessment (LCA). LCA is a vital and powerful tool that encompasses the assessment of overall environmental impact, while complementing other, equally-needed methods and processes to effectively and efficiently maintain consumption and production.

This is in line with the long-term international interest in the so-called “clean technology” and the sustainable development required to improve “eco-efficiency” through the life cycle of a particular product or system, which is particularly important in the food industry.

Keywords: sustainable processing techniques, sustainable development, “clean and green” technologies, zero-waste production, Life Cycle Assessment of the products

BODY COMPOSITION ASSESSMENT IN YOUNG ATHLETES

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Abstract:

With the rapid development of sport and sport sciences, it became clear that optimal fitness is essential to attain the desired level of athletic performance. One of the most important components of fitness is body composition. At the beginning of this lecture, we will discuss the importance of body composition in top-level sport, with an emphasis on the period of childhood and adolescence. After that, we will present methods for body composition assessment and to compare their role in determining body composition in children of athletes. Particular attention will be given to the accuracy and precision of these methods as well as to the correct interpretation of the results of the analyses.

Keywords: fitness, body fat, skinfolds, performance

BIOLOGICAL, NUTRITIONAL AND HEALTH ASPECTS OF SPICES

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Abstract:

For centuries people used food exclusively as an energy source, for survival, but by explanation of nutritionally significant food compounds numerous health aspects of food were clarified and proved. Lifestyle as well as diet recently gain more and more attention with the main aim of improving general life quality. Numerous scientific researches prove that introducing foods rich in nutrition have a positive effect on the health of the entire human organism. Precisely because of mentioned, the consumer's interest in food of natural origin (minimal industrially processed) with no added potentially harmful chemical additives is growing. This trend has also potentiated the growing use of aromatic herbs, their extracts and essential oils as a spice in the daily diet. Aromatic herbs, or spices, have a wide areal spread and can be found all over the world, coupled with their traditional use in culinary or medical purposes in the prevention and treatment of many illnesses. On the territory of the Republic of Croatia, Mediterranean area can be singled out as originating of many aromatic herbs species such as sage, oregano, thyme, garlic, rosemary and others, which are found as wild species or are cultivated for the spices production. Numerous industries, in particular the food, pharmaceutical and the animal feed industry, are currently exploring potential nutritionally efficient and safe biologically active spice compounds (phytochemicals) that will clearly define the modes of action and benefits for human health. Namely, with the aim of using spices for the purpose of health, it is necessary to know their chemical composition. Spices are a rich source of various macro and microelements (calcium, phosphorus, magnesium, zinc), vitamins and other phytochemicals from the category of bioactive compounds, specialized metabolites, from which are the most important: polyphenol compounds, alkaloids, flavonoids, flavonols, quinines, polypeptides, terpenes and others. Mentioned chemical compounds exhibit a significant therapeutic value, such as antioxidant and antiseptic activity, which is why they also find use in the treatment and prevention of respiratory, gastrointestinal, cardiovascular, inflammatory, diabetic and reduce the risk of cancer and neurodegenerative diseases. Specialized metabolites isolated from spices shows the exceptional ability to inhibit the free radicals, and thus the suppression of oxidation processes which cause permanent cells damage. However, one of the most famous spice effects is antibacterial activity since many contain chemical compounds of significant antimicrobial activity, which is why spices are often added to the food, to slow down and prevent the growth of numerous microorganisms. Further researches into the mechanisms of spice compounds action, particularly in in vivo conditions, are necessary for development of new generation of functional ingredients in human nutrition.

Keywords: aromatic herbs, specialized metabolites, polyphenolic compounds, antioxidant activity

DIETARY SUPPLEMENT INTAKE AMONG PROFESSIONAL YOUNG ATHLETES

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Abstract:

Dietary supplement intake among children athletes is still unknown theme in Croatia and this part of Europe. This study was designed to examine the differences between dietary supplement intake among young male athletes different chronological ages (14-18 years old, mean±SD=15,59±1,40) who come from different type of sports: football (n=35), basketball (n=44), waterpolo (n=31), and young non – athletes male (14-18 years old, mean±SD = 16,44±1,35). Young male athletes were asked to fulfill modified questionnaire one of German study, and they were asked to find his same aged non – athlete friend to fulfill the questionnaire too. Differences between quantity values male athletes and non – athletes were compared with χ^2 (Chi – square) test, and differences between quality values with Student t-test. Values which were gotten are difend by error $p < 0,05$. Dietary supplement among children athletes results higher intake vitamins – mineral preparations (athletes – 90,9%; non – athletes 65,4%), beverages (athletes – 84,5%; non – athletes 40,2%), carbohydrates (athletes – 60,9%; non – athletes 23,3%), proteins (athletes – 56,4%; non- athletes 19,6%), creatine and herb capsules (athletes – 30,9%; non – athletes 14,9%). In conclusion, based on obtained results, we can affect on education and regular dietary supplement intake between people all ages, specific young male or female athletes essential age in future similar researches.

Keywords: dietary supplements, children athletes, complex sports

RAW FOOD AND PALEO DIET

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Abstract:

Nowadays we are witnessing the rising popularity of various new diets and nutrition trends. They are not new, but are Paleo diet and raw nutrition just a trend? As the popularity of these diets increases, the discussion of their potential health benefits and risks also arises.

Raw food or “raw” veganism is generally considered to be diet that does not include food processing methods such as cooking, homogenizing, pasteurizing, sterilizing, etc. On the other hand, it involves soaking, dehydrating, blending, juicing and ways that heat up food at temperatures up to 40-48 ° C, and is based mostly on fruits and vegetables, nuts, seeds, germs and legumes intake.

A modern diet based on presumed diet of our Paleolithic ancestor, so-called Paleo diet, includes lean meat, fish, seafood, fruit, vegetables, roots, eggs and nuts intake with exclusion of grains, dairy products, salt and refined fats and sugars.

They are often attributed with health benefits such as body mass reduction, risk reduction of cardiovascular diseases, diabetes, metabolic syndrome, and some types of cancers. In addition to benefits, there are some potential health risks that go with them as well. Diets like that may not be properly balanced and are often lacking in certain nutrient intake or exclude whole food groups which may lead to nutrient deficiency.

The aim of this lecture is to provide basic framework for these diets and a short overview of available scientific literature on possible positive and negative effects on human body.

Keywords: diet trends, raw food, paleo diet, health benefits and risks.

AYURVEDA – BASIC PRINCIPLES IN AYURVEDIC NUTRITION/ AYURVEDIC NUTRITION IN PREVENTION AND CURE

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Abstract:

Ayurveda is traditional medicine system from India, old more than 5000 years. Ayurveda has different branches, as preventive and curative medicine. Ayurvedic health approach is holistic and include physical body, mind and spirit. Mainly ayurveda use in their treatment food, medical herbs, minerals, massage therapy and yoga therapy.

This lecture gives short overview of basics in ayurveda, therefore next time we are able to move forward into more specific topics.

Ayurvedic nutrition differ according to age, sex and physical activity as well as modern nutrition science. Ayurveda also include knowledge of individual body constitution (prakruti), disbalance (vikruti) and stage of disease manifestation (samprapti), strength of the agni (digestive fire or digestion capacity), presence of ama (toxins) in the body. Also, ayurvedic nutrition regime follows seasonal changes, which can help in prevention or restoring of health. Ayurveda consider everything what influence our body as food (for example emotions which can produce different agni (digestive capacity). Food in ayurveda are classified according to taste and there is known 6 tastes: sweet (madhura), Sour (amla), Salty (lavana), Bitter (tikta), Pungent (katu), and Astringent (kashaya). Also, ayurveda recognize action of food in digestive tract (virya), and post digestion action (vipaka). Basics of ayurveda include knowledge of 5 elements which in combination gives 3 dosha. These 5 elements, 3 dosha and their quality are present on our body and also are present in food, herbs and medical plants. According to that one need to choose proper food with proper characteristic according to specific needs mention above.

In the field of ayurveda today there are many scientific papers which delighted what ayurveda has known thousands of years. Turmeric, pepper, ginger, coriander are just few herbs which are scientifically processed, where we can follow knowledge in ancient ayurvedic scripture revived by science. Also ayurveda gives specific guidelines in different disease: inflammatory, gastric, skin etc. In my practice combination of modern nutrition knowledge and ayurvedic nutrition and diagnostic approach gives me better understand and results in curing disease as well in prevention (pregnancy, childhood, sportsman etc).

Keywords: ayurveda, ayurvedic nutrition

NUTRITION KNOWLEDGE IN CHILDREN AND ADOLESCENTS ATHLETES

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Abstract:

Nutrition has been highlighted for the successful implementation of the training process, the competition and the achievement of results. Nutrition plays an extra-significant role for children and adolescents since they are in a period of intense growth and development. It is significant to examine nutrition knowledge and then promote the importance and impact of nutrition on performance so can athletes, coaches and parents invest needed time and effort.

Questionnaire was prepared upon the questionnaires used at the University of London, Institute for Epidemiology and Health Care, Department of Behavioral Sciences and Health Research. Questions were divided in segments: 1. Knowledge: How many meals are recommended daily?, 2. Content: What foods have high or low salt content?, 3. Attitude: How to maintain optimal weight?, 4. Sports nutrition: Should nutrition for athletes be under the supervision of nutritionists?

Body mass and body height were measured to gain body mass index (BMI). The analysis was done with regard to gender, age and sport. Statistical methods used were: descriptive statistics (frequencies, mean, standard deviation), and for the analysis t- test for independent samples (with SPSS 21.0).

Participants were 160 (49.2%) male and 151 (46.5%) female athletes. The mean age was 13.37 ± 3.91 . Mean BMI was 19.20 ± 3.40 . Frequency between type of sport was: 32,3% athletics; 19,7% karate; 19,1% taekwondo; 6,8% football; 6,2% tennis; 5,8% volleyball and the others.

When examining all the mentioned segments no statistically significant difference was found. BMI correlates significantly only with the scale of the attitudes ($r=0.127$, $p=0.022$). There was weak but significant correlation. A significant difference with respect to sport is only for the food content, which is less known by athletes ($t = 2.020$; $p = 0.044$) compared to the rest of the sample. Ball playing related sportman are better at the knowledge ($t = 2.613$; $p = 0.01$) and knowledge of sports nutrition ($t = 2.481$; $p = 0.015$). Team sports are the best in all scales and in overall results ($p \leq 0.010$). Martial arts do not differ in almost all scales except they are considerably worse on the knowledge ($t = 3.851$; $p = 0.000$).

Keywords: nutrition knowledge, nutrition attitudes, children athletes, adolescent athletes.

NUTRITION AND SUPPLEMENTATION DURING LACTATION

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Abstract:

Breastfeeding is a natural way of feeding a newborn as it provides all the essential nutrients necessary for its appropriate growth and development. Also, the period of breastfeeding is a delicate period when the emotional and physical connection between mother and child is created, providing the child with a sense of security, relaxation, and tenderness. In accordance with that, a devotion of institutions and various associations to raise social and health awareness and promote the importance of breastfeeding is constantly increasing. World Health Organization (WHO) recommends infant nutrition based exclusively on mothers milk during the first six months of life, which gives the child many short- and long-term benefits. When talking about benefits, the emphasis is put primarily on the wellbeing of the child, while the focus on the needs of a nursing mother should be of equal importance. In fact, the period of lactation and breastfeeding demands greater energy intake than the period of the last three-semester of pregnancy to meet all micro- and macro-nutrient needs of mother and child. The quality of infant nutrition partially depends on the quality of the nutrition of the mother, and partially on the physical supplies of the mother from which nutrients are being compensated in the case of a deficit. In order to avoid negative effects of lactation and breastfeeding on health and the nutritional status of the mother in upcoming periods of life, it is crucial to give special attention to various, balanced and energy satisfying nutrition. Although the primary goal is to achieve the recommended intake of all essential nutrients by food intake, in cases of unbalanced nutrition, health problems or practicing restrictive diets, use of dietary supplements is needed. Based on biological needs and common deficits, dietary supplements for lactating women usually contain iron, calcium, zinc, iodine, folate and vitamins B12, C and D.

Keywords: lactation, breastfeeding, nutrition, supplementation

NUTRITION IN FERTILITY, PREGNANCY AND LACTATION - NUTRITION AND MALE FERTILITY

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In the summer of 2017 researchers from Hebrew University and Mount Sinai medical school published a study indicating that sperm counts in the U.S, Europe, Australia, and New Zealand have fallen drastically by up to 59% since 1973. Data from the rest of the world was deemed to be insufficient to draw conclusions from, but there were studies suggesting that this figure could also indicate a worldwide trend.

The paper was a meta-analysis by a team of epidemiologists, clinicians, and researchers that assessed data from 185 studies and samples were taken from almost 43,000 men of mixed age groups. Sperm counts went from 99 million sperm per millilitre of semen in 1973 to 47 million per millilitre in 2011, and the decline has been accelerating.

Since this date, broad agreement exists about a general decline in fertility and the consensus is that the reasons are multifaceted and can be difficult to assess.

The purpose of the study is to systematically review the data, possible reasons and also potential solutions to the question – are we heading for zero sperm in 40 years or less, and what can we do about this? Also is low male fertility a canary in the coal mine, and does this have implications for overall male health?

SUPPLEMENTATION IN PREGNANCY

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Abstract:

Introduction: Pregnancy is a critical period of plasticity during which fetal development may be significantly influenced by different environmental factors, including maternal nutrition. Although obvious in theory, practical optimization of nutritional status among pregnant women remains a challenge for every day health care praxis and pregnant women. Known higher needs for folate, vitamin D, calcium, iodine, DHA and iron are well documented, however, the question of optimising the intake and individualization of the formula being supplemented remains controversial as new research questions the actual recommendations and brings new insights.

A review of relevant and recent scientific literature and recommendation highlighting the when, why and how to supplement in pregnancy to prevent common nutrient deficiencies or potential side effects from over supplementing.

The main recommendation for supplementation in pregnancy are still the World Health Organisation's comprehensive guidelines on antenatal care from 2016 with an additional technical consultation on „Implementation considerations for successful incorporation of multiple micronutrient supplements in pregnancy into existing programs” from 2018. However, the only firm recommendation on supplementing on population level is only iron with 30 to 60 mg of elemental iron and folic acid with 400 µg (0.4 mg) as early as possible (ideally before conception) to prevent maternal anemia, puerperal sepsis, low birth weight, preterm birth and neural tube defects. Although some new research highlights the need to consider supplementing better bioavailable forms of folate, and some other nutrients as well, in the context of the recommendations is to supplement with calcium, vitamin A and zinc, and as not recommended to supplement to improve maternal and perinatal outcomes are vitamin B6, E, C, D and multiple nutrients supplements, unless proven deficient of course.

Conclusion: Given recommendations seem not to offer an optimal solution worldwide and rising concern among pregnant women is their metabolic health with a question of early fetal programming and disposing newborns to non-communicable chronic diseases throughout the lifespan.

Keywords: recommendation review, folic acid, iron, multivitamins, fetal programming

NUTRITION IN INFLAMMATORY BOWEL DISEASE

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Abstract:

Inflammatory bowel disease (IBD), predominantly Crohn's disease (CD) and ulcerative colitis (UC), is a global disease in the 21st century, with prevalence rate around 0.2%. IBD affects children as well as adults, and it seems that around 50% of IBD may now present during childhood and adolescence. IBD is including the inflammation changes in gastrointestinal tract what encouraged the investigations of the relationship between nutrition and disease, both in regard of prevention and treatment. Malnutrition is the biggest issue in patients with IBD, however it affects more patients with CD as in this case any part of the gastrointestinal tract, unlike UC, which is restricted to the colon, can be affected by the inflammation. As in adults, malnutrition is prevalent in paediatric IBD patients, where it can have long lasting consequences on growth and development. Malnutrition is the result of reduced oral intake, increased nutrition needs, increased gastrointestinal losses of nutrients and occasionally from drug-nutrient interaction, but also the result of the activity, duration and extent of the disease. Nutritional approach in adults and children is different, as, for now there is no recommended type of diet one should use to treat IBD in adults. There are elevated needs during acute time, but during the remission no specific diets should be recommended. On the other hand, the first line of treatment of CD is exclusive enteral nutrition, which is as effective as corticosteroid therapy. Nowadays there are new dietetic approaches as Crohn's Disease Exclusion Diet CDED and CD Treat which have very promising future in treatment of CD but also in prolonging the remission state.

Keywords: inflammatory bowel disease, nutrition, malnutrition

SUSTAINABLE FBDGS – SOME ENVIRONMENTAL CONSIDERATIONS

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The Federation of European Nutrition Societies (FENS) has been charged to provide relevant advice to European countries on how best to construct sustainable food-based dietary guidelines (SFBDGs) in the context of their own cultures, climates, and geography. Various working groups were established, one of which has been studying environmental aspects. This group agreed to consider:

- Greenhouse gas emissions (GHGEs);
- Food and biodiversity;
- Animal-based versus plant-based protein;
- Land use, soil quality and erosion;
- Water and eutrophication;
- Energy use;
- Food packaging;
- Food waste.

The findings and recommendations of the group in relation to some of the above will be discussed, with special emphasis on food waste.

Keywords: FENS, sustainability, dietary guidelines

NUTRITION IN MULTIPLE SCLEROSIS

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Multiple sclerosis (MS) is a complex chronic inflammatory autoimmune disease-causing neurological disability in mostly young adults, more often women, typically affecting individuals between 20 and 40 years of age. Environmental factors with the strongest evidence for association with MS are viral infections, smoking, childhood obesity, vitamin D deficiency, and poor dietary habits. However, one must bear in mind that MS is a complex disease where one factor cannot be the sole cause. This is especially important when talking about nutrition in MS, which will be further discussed in this talk.

Currently, the role of dietary factors in MS pathogenesis is still unclear. However, nutritional population studies suggest that analysis of nutrition pattern (the way of eating) is the most realistic approach to assess associations between overall diet and health or disease, rather than focusing on single dietary component. Dietary factors have been suggested as a possible cause of MS; however, scientific evidence for this association is still lacking. Most studies investigating diet and MS risk present negative results, inconsistent in findings, or concentrated on individual nutrients or foodstuffs. Nevertheless, around 50% of MS patients are looking for complementary and alternative treatments where adequate diet is their primary focus. Unfortunately, most of the patients explore diets and other alternative treatments without the advice of the physician, which can lead to more comorbidities such as malnutrition, metabolic syndrome, cardiovascular disease and worsening of the symptoms. This is why it is important to have in mind that nutritional treatments and different dietary approaches should be under medical supervision and accurate nutritional counseling should be encouraged in clinical practice. Nutrition needs to be complementary, not alternative to the therapy.

Because there is a limited number of large-scale prospective studies in this moment, there are no official recommendations or guidelines regarding nutrition in patients with MS. However, an overall healthy lifestyle including balanced diet and regular physical exercise is recommended.

Keywords: Multiple sclerosis, nutritional treatment

NUTRITION IN PSORIASIS PATIENTS

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Abstract:

Psoriasis is a chronic immune-mediated inflammatory skin disease that affects 2 to 3% of the population worldwide. Psoriasis is caused by a complex interplay between the immune system, psoriasis-associated susceptibility loci, autoantigens, and multiple environmental factors such as smoking, emotional stress, alcohol consumption, obesity and diet.

Psoriasis Area and severity Indeks (PASI) score is the preferred method to estimate the disease severity and its extent. An environmental factor of high interest to patients is the influence of diet, improper nutrition, inadequate body weight and metabolic diseases which may increase the clinical symptoms or even trigger the disease.

Some studies showed that psoriatic patients have a higher intake of simple carbohydrates, total fat and higher intake of omega 6 polyunsaturated fatty acids and lower consumption of proteins, complex carbohydrates, monounsaturated fatty acids, omega 3 polyunsaturated fatty acids and fibers. High levels of arachidonic acid and its derivatives with pro-inflammatory activity are present in cutaneous lesions of psoriatic patients.

Diet and psoriasis severity suggests the possible beneficial effect of nutritional interventions promoting Mediterranean food pattern. Mediterranean diet is rich in monounsaturated and omega-3 polyunsaturated fatty acids, vegetables, fruits and fibers, with restricted intake of SFA, simple carbohydrates, sugars suggested as nutritional approach in psoriatic patients.

In epidemiological studies obese patients have increased risk of psoriasis and clinical outcome in obese psoriatic patients is poorer. Abdominal obesity is a chronic inflammatory condition where fat cells adipocytes secrete pro-inflammatory signals. Low calorie diet improves PASI but only if the topical or systematic therapy was introduced.

Dietary changes alone do not cause the large effect in psoriasis but may become an important adjunct to current first line treatment so the nutritionists should play an important role in evaluation and management of psoriatic patients.

Keywords: psoriasis, obesity, nutrition

ELIMINATION DIETS

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Abstract:

Elimination diet understands complete avoidance of one or more foods from the diet. Reasons for the elimination diet can be numerous, but the most common reason is potential (suspicion or proven) adverse reaction to certain food.

Adverse reactions to food can be toxic (e.g. heavy metal poisoning, microbiological food poisoning) and non-toxic (those with immune basis- food allergy and coeliac disease), or those without an immune basis- termed as food intolerances).

Symptoms of food allergy and intolerance can be very similar, hence it is very important for allergy or immunology specialist to perform the right clinical diagnostics, e.g. detailed clinical history, examination, biochemical parameters, use of validated diagnostic tests, determination of nutritional status. There are many diagnostic tests in use today that can help in better diagnostics of the type of adverse reaction to food, but it is important to emphasize that only those tests approved by the leading institutions in this field are valid. The opinion of the leading European and American institutions for allergy and immunology is that tests such as hair analysis, specific determination of IgG and IgG4, bioresonance, kinesiology, cytotoxic tests, iridology, electrodermal tests, sublingual intradermal provocation neutralization are unvalidated and with no scientific evidence to support their use in the diagnosis of food allergy and intolerance.

In practice, elimination diets are used both for diagnostic and therapy purposes. The elimination diet is conducted for as long as it is possible to notice changes in symptoms appearance (2-6 weeks). At this point results of the elimination diet must be evaluated and then a specialist can make a decision about the next steps, usually performing oral food challenge in order to determine or exclude food allergy or intolerance to certain food.

It is important to know that any elimination diet can include health risks. Therefore, some of the questions being asked are: what are the reasons for the elimination diet, is it self-diagnosis, whether and which diagnostic tests were used, is the diet at all justified, and is it supervised by trained professional staff (allergologist, immunologist, nutritionist)?

An elimination diet for diagnostic or therapeutic purposes can be conducted for a specified period of time only under expert supervision. Despite its elimination, such diet needs to provide all the nutrients necessary to preserve the good nutritional status and health of the individual.

Keywords: food, allergy, intolerance, diagnostic tests, elimination diet

IRRITABLE BOWEL SYNDROME

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Abstract:

Irritable Bowel Syndrome (IBS) is a common gastrointestinal disorder manifested by abdominal pain and altered bowel movements for at least three months. It affects the small and large intestine, and 10-15% of adults, mostly women, suffer from this disorder. The exact cause is unknown, but it is believed that the onset of the syndrome is affected by inflammation and infection, stress and impaired neurotransmitter and microbiota balance. There are numerous tried treatments so far and they include fiber supplements, peppermint oil, probiotics, antidepressants, psychotherapy, dietary changes, acupuncture, antidiarrheals, and laxatives. Sometimes irritable bowel syndrome is also called abdominal headache or "nervous bowel".

Regardless of what are the true factors that cause irritable bowel syndrome (infection, hormones, stress or imbalance of the gut microbiota), eating habits can have a significant impact on the pain and discomfort of people suffering from the syndrome. When prescribing a diet, the overlap of this condition with certain food intolerances (lactose, fructose, carbohydrates, and histamine), food allergies and hypersensitivity to non-celiac gluten (NCGS) should also be considered. More recent scientific evidence indicates that a relatively restrictive elimination diet low in certain natural sugars can alleviate bloating, reduce gas, relieve pain, and other symptoms in patients with irritable bowel syndrome. In recent years, several studies have suggested a significant improvement in symptoms in patients who discarded foods rich in certain natural sugars (fermentable sugars, oligosaccharides, disaccharides, monosaccharides, and polyols - so-called FODMAP foods) such as rye, wheat, garlic, onion, artichoke, mushroom, cauliflower, beans, chickpeas, lentils, honey, apple... Although a diet that excludes so-called FODMAP foods does not work for all patients, a growing number of experts support its principles, at least when it comes to short-term administration. However, such a diet is quite complex and needs to be carried out with the supervision of a doctor or nutritionist to keep the diet nutritionally balanced. The long-term use of the FODMAP diet has not been sufficiently investigated to date, and it is generally advocated for the gradual liberalization of the diet following a reduction of symptoms in the intensity, especially in light of knowledge about the effect of this diet on the intestinal microbiota diversity.

Keywords: IBS, nutrition, FODMAP, intestinal microbiota

GUT MICROBIOTA IN OBESITY AND UNDERNUTRITION

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Abstract:

We are not only human, we are a collection of human and microbial cells, intertwined in a way no one thought possible, not so long ago. This plethora of microorganisms living in and on our bodies, are collectively called microbiota. In recent decade microbiota has become an important factor for determining our health and wellbeing. A balanced microbiota helps us get the most from our food, biosynthesize vitamins and keep our immune system in check, while imbalanced one is implicated in development and onset of various diseases and disorders – including gastrointestinal disturbances, metabolic diseases, malnutrition as well as neurological disorders.

Over our lifetime microbiota shows great fluidity and plasticity and is influenced by various external and internal factors. Some, like our genetic makeup or environment, are difficult or even impossible to influence while others, like diet and lifestyle, are highly modifiable. Diet is one of the most important factors affecting our gut microbiota and the food we eat can show both positive and negative effect on the composition and abundance of our gut microbiota.

In this talk we will present current understandings of microbiota's plasticity and fluidity and factors affecting it. We will focus on role microbiota plays in development and treatment of obesity and undernutrition. This talk will present current research on composition of gut microbiota in obese individuals and ways we can modify it towards positive outcomes. Because interplay of microbiota and humans as hosts is an extremely complex system to investigate, we will also present a simplified in-vitro model of large intestine e.g. colon. Colon has by far the greatest abundance of microbiota in our body and probably influences our wellbeing the most, and simulation of microbiota growth in a bioreactor mimicking colon conditions is a useful tool which can give us valuable insight into dynamics of our microbiota. The bioreactor work which will be presented is supported by Croatian science foundation grant no. IP-06-2016 "MicroEquilibrium – Exploring Gut microbiome Equilibrium".

Keywords: microbiota, diet, obesity, undernutrition, bioreactor

3. ABSTRACTS OF SPONSORED LECTURES

PLANT BASED BEVERAGES IN HUMAN DIET

Adez

Coca-Cola HBC

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Abstract:

With the rise in alternative diets, health conscious consumers, people with lactose intolerance and the growth in environmental awareness, it is of no surprise that the consumption and offer of plant based beverages has been increasing worldwide. Moreover, plant based beverages category is estimated to grow ahead of other categories, driven by Health and Wellness trend with a CAGR of 35% until year 2022.

Plant based beverages, also known as “plant-based milk” or “plant milk,” are manufactured by extracting plant material, such as seeds or grain, in water. In order to mimic the nutritional composition of cows milk, many plant based beverages contain added vitamins and minerals, most commonly calcium, vitamin D and B vitamins. Although there is no stated classification of plant based beverages in literature, a general classification divides them into five categories: cereal based (oat milk, rice milk, corn milk and spelt milk), legume based (soy milk, peanut milk, lupin milk, cowpea milk), nut based (almond milk, coconut milk, hazelnut milk, pistachio milk, walnut milk), seed based (sesame milk, flax milk, hemp milk, sunflower milk) and pseudo-cereal based (quinoa milk, teff milk, amaranth milk).

Plant based beverages are often used as a replacement for dairy milk in people who are intolerant to lactose or allergic to cow's milk protein as well as in health conscious consumers because of their health properties. More specifically, plant based beverages don't contain lactose and cholesterol, and many contain added vitamins and minerals. Soy and pea milks are also known for their higher protein contents compared to other plant based beverages. Oat and some other plant based beverages contain soluble fiber as an additional nutrient. Additionally, many plant based beverages contain functionally active components with health promoting properties.

With consumer's focus on health and sustainability, plant based beverages are gaining a significant importance and popularity on the market. As more and more high quality products are available for people to explore and enjoy, plant based beverages are becoming a part of well balanced, nutritious diet.

Keywords: plant based beverages, alternative diets, health conscious consumer, nutritional properties

MEDICINAL PLANTS FOR THE DIGESTIVE SYSTEM

Fiprom Ltd
Soria Natural

dr.sc. Stribor Marković, mag.pharm.

Abstract:

Although medicinal plants were used from the very beginning of man a species, in XXI century the question of their rational application in the present time arises.

In the context of the gastrointestinal tract, the use of medicinal plants has been most prevalent in the treatment of functional dyspepsia i.e. difficult digestion. A number of plants are used in this context, including artichoke and dandelion. The active substances of these plants are a mixture of several classes of active substances such as bitter sesquiterpene lactones.

Medicinal plants are also used in the context of appetite increasing, and the use of herbs like dandelion can be interesting especially for children. A number of herbs, such as chimney, yarrow and lemon balm, reduce the subjective symptoms of spasms in the digestive system. One part of the plants retained its place as an anti-inflammatory herb, such as licorice, which can be used as adjuvant treatment for gastritis.

Possible side effects of contraindications should be identified for each plant to ensure their safe use.

Keywords: medical plants, digestive system

DIABETES AND ROLE OF ENTERAL NUTRITION

Belupo Pharmaceuticals and Cosmetics

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Abstract:

Diabetes mellitus is widespread among overall population and it is growing both in western and developing countries. However the prevalence of type 2 diabetes is increasing much more rapidly than diabetes type 1, largely due to the rising occurrence of obesity (body mass index >30) and also due to increased age. As diet is very important for patients with diabetes, the nutrition prescription is an integral component of diabetes management and should be managed by a nutritionist or other qualified healthcare professional from the time of diagnosis of diabetes. Nutrition prescription should be based on medical, lifestyle, and personal factors and must include education of patients.

Patients with diabetes should often eat small meals at regular intervals. The daily food intake should be distributed in 3-6 meals (3 main and 2-3 snacks). Nutrition plan should target good control of blood glucose levels and adequate weight in synergy with diabetes therapy and physical activity. According to ESPEN recommendations, lowering dietary glycaemic index (GI) and glycaemic load (GL) may conversely improve these outcomes and benefit patients with obesity and diabetes. Maintaining good nutritional status during hospitalization is vital. Oral nutritional intake is actually the most common way to cover the needs of the majority of patients and therefore it represents the first-line nutritional measure to tackle hospital malnutrition for patients in whom it is possible and safe to cover their dietary needs by ordinary food. The indication for nutritional support in patients with type 1 diabetes is predominantly due to intercurrent illness rather than to the diabetes. Therefore the composition of nutrition support is dependent on the goal of nutrition support (e.g. muscle mass gain, wound healing, growth in children). Patients with type 2 diabetes are commonly obese and their lean body mass is relatively low compared with non-diabetic obese individuals; this combined with the fact that their basal metabolic rate tends to be high puts them at special risk of developing malnutrition in the presence of intercurrent illness. The new generations of diabetes-specific formulas are hypocaloric and contain a carbohydrates that are slowly digestible and have low GI as well as monounsaturated fatty acids and dietary fiber. In addition to specific composition, diabetes-specific formulas are slightly sweeter for it was shown that there is a significant correlation between the increased taste thresholds and the higher level of blood glucose concentration suggesting a blunted sweet taste response in patients with type 2 diabetes. Oral feeding is always the first choice to prevent or treat undernutrition in patients. Enteral nutrition should be used for patients who fail to cover their nutritional needs by hospital food or food fortification. The use of diabetes-specific formulas with a low GI should be the preferred option for the nutritional management of diabetic patients in need of nutritional support.

Keywords: diabetes, nutritional support, enteral nutrition, diabetes-specific formulas

POSTBIOTICS AND HMOs IN INFANT FORMULAS

Aptamil

Pharmacia laboratorij Ltd

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Abstract:

Nutricia, Europe's leading infant food manufacturer with a tradition of over 120 years and dedicated nutrition and immunity research, inspired by breast milk develops milk formulas to provide an alternative when breastfeeding is not possible. To get as close as possible to the gold standard -

breast milk - infant formulas of a new generation combine a unique fermentation process to create bioactive components that positively affect immunity through digestive tract health and the addition of HMOs (human milk oligosaccharides) further promotes the effects that breast milk provides to breastfed infants.

Keywords: postbiotics, HMOs, breast milk, infant formulas

10 MINUTES OF ABBOTT SCIENCE

Abbott Nutrition Abbott Laboratories Ltd

Ivan Radoš, MSc

At Abbott, we understand that proper nutrition is the foundation for living the best and fullest life possible. That's why we develop science-based nutrition products for over 90 years for people of all ages. Abbott develops products that help babies and children grow, keep bodies strong and active, and support the unique nutrition needs of people with chronic illnesses – to make every stage of life a healthy one.

Since medical nutrition or enteral nutrition is a valuable clinical intervention for patients of all ages in a variety of care settings, Abbott is committed to provide evidence-based products by conducting various clinical research on product effectiveness (e.g. randomized controlled trials) and studies on cost-effectiveness of nutrition interventions.

Our therapeutic nutrition products are designed to help healthcare professionals and patients to meet the unique nutritional needs with a variety of conditions, including cancer, malabsorption, diabetes, celiac disease, kidney disease and osteoporosis.

HYDRATION AND MICRONUTRIENT NEEDS FOR YOUNG ATHLETES

Jamnica plus Ltd

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The main goal of nutrition planning for children and young athletes, in addition to meeting the increased nutritional needs associated with higher physical activity levels, is to support the growth and maturation, as well as overall health. Adequate hydration plays an important role in optimizing sports performance, recovery and thermoregulation, and regarding micronutrient needs, several have been identified as critical to young athletes. Considering the above, fluid choices for optimal hydration in given circumstances will be discussed, as well as the perceived need of supporting child and adolescent athletes' nutrition with fortified foods and micronutrient dietary supplements.

EFFECT OF MAGNESIUM BICARBONATE-RICH WATER MG MIVELA ON HIGH NORMAL AND HYPERTENSION GRADE 1 BLOOD PRESSURE

Jamnica plus Ltd

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Abstract:

Purpose: To evaluate the potential of magnesium bicarbonate-rich natural mineral water Mg Mivela on cardiovascular parameters, in particular to blood pressure, in subjects with high normal or hypertension grade 1 blood pressure levels.

Materials and methods: This randomized, double-blind, placebo-controlled, two-center pilot study enrolled 50 subjects, 18-65 years old, with high normal or hypertension grade 1 blood pressure (130-159/85-99 mmHg). After a two week run-in phase, 33 subjects were assigned to 1l a day (500 ml in the morning and 500 ml in the late afternoon/early evening) of Mg Mivela (339 mg/l magnesium, 2074 mg/l bicarbonate) and 17 subjects to placebo water (15 mg/l magnesium, 543 mg/l bicarbonate), for the following 8 weeks. There were four visits at the study centers (Charité University Medicine Berlin and Analyze & Realize GmbH, Germany) during the trial (screening, baseline, control and the final visit). Blood pressure, heart rate measurements, physical examination, blood and urine laboratory parameters, body weight, dietary diary and physical activity questionnaire, assessment of adverse effects and global evaluation of benefit and tolerability of the water consumed were assessed. Statistical analysis was performed by applying General Estimating Equations, Wald Square Chi-square testing, exact Fisher test, Mann-Whitney U test and Wilcoxon test.

Results: There was a significant time-dependant difference in the reduction of blood pressure, showing that consumption of Mg Mivela over eight weeks yielded in a greater reduction of blood pressure compared to the placebo, with mean difference in systolic blood pressure of -6,1 mmHg vs -1.2 mmHg ($p < 0.001$) and diastolic blood pressure of -4.9 mmHg vs -2.8 mmHg ($p < 0.001$) respectively.

Conclusion: The consumption of 1l Mg Mivela water daily over the period of eight weeks was shown to be excellently tolerated and associated with beneficial effects on blood pressure in subjects with high normal or hypertension grade 1 blood pressure. Clinical trial registration DRKS-ID: DRKS00009383

Keywords: magnesium, mineral water, cardiovascular, blood pressure, hypertension

4. POSTER SECTION ABSTRACTS

EX VIVO ANALYSIS OF ANTIOXIDANT ACTIVITY OF ALCOHOLIC EXTRACT OF HEMP (*Cannabis sativa* L.)

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Introduction: Next to well-known group of phytocannabinoids, Hemp (*Cannabis sativa* L.) contains non-cannabinoid phenols such as flavonoids (apigenin, luteolin, camferol, quercetin, canflavin A and canflavin B) which are recognized as natural antioxidants. Flavonoids, due to their chemical structure, play an important role in the neutralization of reactive oxygen species and thus can prevent the development of many diseases. The aim of this research was to examine antioxidative and hepatoprotective properties of alcoholic extract of hemp.

Materials and methods: In this research industrial hemp was tested. Ex vivo examination of alcoholic extract were performed on Wistar rats liver homogenates. Animals were divided into 4 groups of 6 animals. The first two groups consisted of healthy rats. One group was given a saline for 7-days through gastric probe whereas another group, on the same conditions, an alcoholic extract of hemp. The third and fourth groups were given intraperitoneally streptozotocin that induced diabetes, which led to oxidative stress. After that, the third group was given a saline and the fourth group was given an alcoholic extract of hemp on the same conditions as first two groups. After animal sacrifice, blood was taken for examination of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activity and liver samples for examination of lipid peroxidation and antioxidant enzymes: catalase, glutathione reductase, glutathione transferase and glutathione peroxidase. All parameters were measured by the spectrophotometric method.

Results: Concentrations of malondialdehyde show that the intensity of lipid peroxidation in diabetic animals after seven days of hemp extract was statistically lower in comparison to animals treated with saline ($p < 0.01$). The activity of the antioxidant protection enzymes was increased in diabetic animals, which justifies good antioxidant protection, also with statistical significance in catalase $p < 0.05$ and glutathione reductase $p < 0.01$. The level of enzymes of hepatocellular damage decreased after the application of extract, statistically significant ALT ($p < 0.05$).

Conclusion: Alcoholic extract of hemp showed an antioxidative property by decreasing lipid peroxidation and increasing values of antiradical enzymes. Also, hepatoprotective activity has noticed after decreasing values of transferases.

Keywords: hemp; free radicals; oxidative stress; antioxidant enzymes

EXTRACTION OF ISOTHIOCYANATES FROM WHITE, BROWN AND BLACK MUSTARD SEEDS AND THEIR EFFECTS ON CANCER CELL PROLIFERATION

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Introduction: White (*Sinapis alba* L.), brown (*Brassica juncea* L.) and black (*Brassica nigra* L.) mustard belong to Brassicaceae family which is known as the mustards, the crucifers or the cabbage family that contains sulfur compounds (glucosinolates). Isothiocyanates are degradation products of glucosinolates which have various biological activities (anticancer, antioxidant, antimicrobial, antifungal). The objectives of this research were the extraction of volatiles rich in isothiocyanates from selected mustard seeds using conventional extraction with organic solvent after autolysis and using microwave extraction and the evaluation of their effects on human cancer cells proliferation.

Materials and methods: White, brown and black mustard seeds were pulverised before isolation. Extraction with organic solvent was used after autolysis (6 h, 37 °C), while microwave (MW) extraction was done using ETHOS X apparatus. Two fractions were obtained after microwave extraction: MW fragrance and MW flavours. The analysis of isothiocyanates content in extracts was done by GC/MS technique. Antiproliferative activity of different concentrations of extracts was determined by MTT assay after 4, 24, 48 and 72 h using two different cell lines: breast (MDA-MB-231) and urinary bladder (TCCSUP).

Results: GC/MS analysis showed that volatile extract from white and brown mustard seeds contain allyl isothiocyanate as dominant compound. The amount of allyl isothiocyanate was 12.68% in microwave flavours fraction after microwave extraction of white mustard seeds. In brown mustard seeds after microwave extraction its content was 94.37% in MW fragrance fraction and 95.20% in MW flavours fraction. After microwave extraction of black mustard seeds its was 6.60% in MW fragrance fraction. After autolysis extraction only but-3-enyl isothiocyanate was detected in black mustard volatile extract (0.82%). The highest antiproliferative activity against both cancer cells showed brown mustard volatile fraction after microwave extraction (70% and 50% after 72h at the concentration of 100 L/mL against breast and bladder cancer cells).

Conclusion: The use of microwave significantly decreases extraction period and it is appropriate manner to obtain volatile fraction of brown mustard seeds rich with allyl isothiocyanate that shows high antiproliferative activity against human breast and urinary bladder cancer cells.

Keywords: isothiocyanates, mustard seed, autolysis extraction, microwave extraction, antiproliferative activity

PARENTAL EDUCATION, EMPLOYMENT AND INCOME INFLUENCE CHILD'S SCREEN TIME, SLEEP DURATION AND CARDIOMETABOLIC RISK – THE CASE OF SCHOOL AGE CHILDREN FROM THE CITY OF OSIJEK

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Introduction: Parental education directly correlates with the employment, income and social position. Parental characteristics shape child's behavior towards food and determine their dietary and lifestyle habits. These determinants also determine the type, amount and the quality of food available in a household. The aim of this research was to determine the role of parental socioeconomic status on child's screen time, sleep and cardiometabolic risk.

Subjects and methods: Two randomized observational studies were conducted on 251 pairs children-parent during medical examination for the first grade entry in 2017 and 2018. Children from the area of Osijek city were enrolled in the study. Parents completed study-specific questionnaire. The average age of children was 6.6 ± 0.4 years, 54.2 % boys and 45.8 % girls. Haemoglobin values were obtained from child's registry database. Child's height and weight were measured and International Obesity Task Force cut-offs were used to classify them according to their state of nourishment. Cardiometabolic risk (CMR; waist circumference in cm divided by height in cm) is a strong predictor for cardio-metabolic risk, in both children and adults. CMR is categorized as low (CMR < 0.5), increased (0.5 – 0.6) and high (>0.6) (Khoury M et al. J Am Coll Cardiol. 2013;62(8):742-51). Statistical analysis was performed with Statistica 13.3 software (at $\alpha=0.05$) and included appropriate parametric tests because the results have normal distribution (Kolmogorov-Smirnov Test).

Results: Children of mothers with high school education spend less time in front of TV ($p=0.010$) and a smartphone ($p=0.022$) in comparison to children of college educated mothers. On the other hand, more screen time (all types) have children of high school educated fathers. Children whose parents are employed have higher Body Mass Index, sleep less but have lower CMR. Children whose parents say that their income is insufficient have the highest CMR and the lowest sleep time in comparison to children of parents who said that their income is sufficient or more than sufficient. Additionally, children whose parents spend two thirds of their income on food have the highest CMR, the lowest haemoglobin and sleep longer

in comparison to families that spend half or one third of their income on food.

Conclusion: The results confirm that children who live in conditions of material deprivation are at the highest risk for developing many health conditions with lifelong consequences.

Keywords: school aged children, parental influence, socioeconomic status, cardiometabolic risk

SUPPORTING THE IMPLEMENTATION OF GUIDELINES FOR HEALTHY NUTRITION IN PREGNANCY

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Introduction: Healthy nutrition during pregnancy is one of the key requirements for growth, development and health of a child that at the same time contributes to mother's health and affects both the lifestyle and nutrition of a family. The existing guidelines for healthy nutrition have been adapted for practical use. Advice and recommendations for healthy nutrition have been formulated and recipes for healthy dishes have been created by taking into account local cultural features and thereby enabling implementation of healthy eating guidelines in everyday life. The advice, recommendations and recipes were collected in a printed booklet entitled What to eat during pregnancy. The aim of the present study is to validate the educational booklet on healthy nutrition in pregnancy.

Materials and methods: Before printing, the booklet was validated by a group of 15 experts based on the following criteria: the publication contains relevant information; texts are clear; illustrations, advice and healthy recipes motivate pregnant women; the booklet is suitable for everyday use at the primary health care level (complementary to counselling). During the visit to their gynecologists, the pregnant women received the printed booklet and the questionnaire that they were asked to return by mail within a month. 109 pregnant women tested the booklet based on following criteria: the booklet contains useful information; texts are clear; illustrations, advice and healthy food recipes.

Results: The experts rated the booklet positively (9.1 on a scale from 1 to 10). The booklet received a positive rating also by the pregnant women (9.5 on a scale of 1 to 10). 72 % of the pregnant women from the aforementioned group apply advice regularly, 61 % of them use the recipes from the booklet at least once a week while 96 % of the pregnant women would recommend the booklet to others.

Conclusion: Printed educational material is a good addition to the healthy nutrition in

pregnancy counselling. It is essential that it provides information that is professional, clear, practical, useful and adapted to the local cultural features.

Keywords: healthy nutrition of pregnant women, educational printed materials

AN EXAMPLE OF PROMOTING HEALTHY NUTRITION IN A LOCAL RURAL COMMUNITY

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Introduction: The use of different methods in promoting healthy nutrition with emphasis on practical methods, innovative approaches, continuity and the implementation of programs in local communities can greatly contribute to healthier eating habits and thereby the health of the rural population.

Materials and methods: In a smaller local community (1268 residents), a program is being implemented which promotes healthy nutrition and physical activity and which was created by the participation of two non-governmental organizations and local community. It is important to emphasize that the program includes all stakeholders of the local community. The program includes: demonstration village garden; competition of amateur chefs in preparation of healthy meals; presentation and tasting of dishes made with groceries from local stores; incorporating the topic of healthy nutrition into already existing activities in local community and media support on local cable television.

Results: Demonstration village garden - designed to show the possibilities of growing vegetable and spice plants and to motivate the local population for self-supply, and consequently a greater consumption of vegetables. During one year, the garden was visited by approximately 300 people.

Competition of amateur chefs in preparation of healthy meals - the activity is intended as a motivation for healthy nutrition and spreading of information among the local population. The competitors are well aware of the principles of healthy nutrition and they can apply them in practice. The visitors rated the tasted dishes as very tasty and suitable for everyday eating.

Presentation and tasting of dishes made with groceries from local stores - selected groceries were presented (e.g. chickpea) with simultaneous tasting (chickpea spread), what motivated the residents to include less familiar groceries in everyday nutrition.

The presented groceries and tasted dishes received the highest ratings. At the same time, the demand for certain groceries has increased.

Incorporating the topic of healthy nutrition into already existing activities in local community at approximately 70 existing local events.

Media support on local cable television - regular publishing of recipes prepared by an expert. 15% of respondents use the recipes.

Conclusion: Innovatively designed programs for promotion of healthy nutrition can contribute to healthier eating habits of the rural population in the long term.

Keywords: healthy nutrition, innovative approaches, local rural community

GUIDELINES FOR HEALTHY NUTRITION – PROFESSIONAL SUPPORT AND MONITORING PROJECT FOR HEALTHY MENUS IN KINDERGARTENS AND SCHOOLS

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Introduction: Project is focussed on professional support and monitoring for implementation of guidelines for healthy nutrition in kindergartens and schools. It is coordinated by the NIJZ

Materials and methods: The WHO methodological recommendations for monitoring nutrition and establishment of professional support on nutrition in schools and kindergartens have been used. Method of nutrition evaluation has been developed gradually and is based on three different approaches: (i) survey among kindergarten and school food-service managers; (ii) indicator-based evaluation of school menu quality and (iii) nutritional values of school meals, estimated by weighed food records.

Results: Guidance for implementing monitoring system with additional instructions and certain criteria has been developed by the NIJZ and the Ministry of Health: the indicator-based evaluation of menu quality with the aim to provide stronger evidence-based arguments for future implementation steps for schools and kindergartens to take. There has also been developed website with credible professional information and online tools for planning balanced meals.

Conclusion: Based on detected state the experts at NIJZ are offering nutrition counselling and also providing professional training for kitchen staff, school food-service managers and education for teachers in Kindergartens and Schools. Established approach offers

systematic, efficient and continuous support and also starting point for work in individual region and on national level in relation to nutrition in kindergartens and schools.

Keywords: monitoring systems, guidelines for healthy nutrition, nutrition evaluation

CONSUMERS' AWARENESS OF THEIR ROLE IN FOOD HYGIENE PRACTICE AFTER THE PURCHASE OF FOOD

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Introduction: After the purchase of food, consumers also have a great responsibility. The aim of this paper was to study consumers' awareness about their role in food hygiene practice after the purchase.

Materials and methods: As a part of students' project, consumers' knowledge and awareness were evaluated through an online questionnaire validated on 13 Croatian participants. The questionnaire was translated into English and German to include foreign participants. The survey was conducted for 10 days (2018). The questionnaire contained 6 questions about food hygiene practice and sociodemographic characteristics of the participants. Microsoft Excel was used as a statistic tool.

Results: 1550 questionnaires were collected of which 1394 Croatian (89.9 %) and 156 foreign consumers (10.1 %) (31 countries). Among Croatians, there were 60.1% younger than 25 and 73.6% women. Among foreign consumers there were 54.5% younger than 25 and 69.2% women. Croatian consumers leave thermally prepared food to cool at room temperature 1-2 hours before putting it in a refrigerator (12.0%), put it immediately (40.6%) or leave more than 2 hours at room temperature (35.5%). Foreign consumers put it immediately (32.1%), put within 1-2 hours (19.2%) or leave more than 2 hours at room temperature (35.9%). Among Croatians, it is observed that men ($p=0.005$), individuals under the age of 25 ($p=0.003$) and people living alone and/or divorced ($p=0.008$) put the food in the refrigerator immediately after the lunch. 17.6% of Croatians and 19.2% of foreigners defrost food in the refrigerator, while 50.8% Croatian and 38.5% foreign consumers defrost food on countertops at room temperature. Additionally, Croatian women have better practice in food defrosting, in

refrigerator, ($p=0.004$) in contrast to men.

Conclusion: According to results, 2/3 of Croatians have adequate hygiene practice in food handling during food preparation, with emphasis on younger men and people living alone. Defrosting practice is in general inadequate, even though women have better practice in food defrosting. Similar results are obtained with foreign consumers. The consumers are mostly aware of their role in the food hygiene practice, but it is desirable to work more on informing of consumers.

Keywords: consumer, hygienic practice, food safety

DIETARY INTAKE IN CHILDREN AND ADOLESCENTS ATTENDING PRIMARY AND SECONDARY SCHOOLS IN ZAGREB ESTIMATED BY 3-DAY FOOD DIETARY RECORD

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Introduction: Proper nutrition is particularly important during the period of growing up. Irregular dietary habits and behaviours that are acquired during childhood and adolescence are the basis for the development of chronic diseases that are by far the largest cause of morbidity and mortality in the developed world. Adolescents become aware that their way of life and eating can affect the body's appearance and because of that adolescence is often the time when they start experimenting with food. The aim of this study was to explore the quality of diet of children attending primary and secondary schools in Zagreb and determine the compatibility of macronutrients (energy, carbohydrates, fat, protein, PUFA) and certain micronutrients (Ca, Mg, Fe, vitamin B1, vitamin D3) intake that are listed as critical in the period of adolescence and for which the food data base we used has all required information with recommended daily requirements (RDA) in relation to gender and age.

Materials and methods: Overall 97 children were included in this research; 69 (71.1%) were girls and 28 (28.9%) were boys; 67 (70.1%) were age 15-19 years and 30 (29.9%) more than 2 hours at room temperature (35.9%). Among Croatians, it is observed that men ($p=0.005$), individuals under the age of 25 ($p=0.003$) and people living alone and/or divorced ($p=0.008$) put the food in the refrigerator immediately after the lunch. 17.6% of Croatians and 19.2% of foreigners defrost food in the refrigerator, while 50.8% Croatian and 38.5% foreign consumers defrost food on countertops at room temperature. Additionally, Croatian women have better practice in food defrosting, in

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Results: In comparison to RDA, boys aged 10-19 years did not meet recommendations for the intake of macronutrients, where energy intake was 72.4%, carbohydrates intake was 62.9%, fat intake was 80% and polyunsaturated fatty acids intake was 39.4%. As for micronutrients, in comparison to RDA, the intake of Ca was 60.9%, Mg 75.8% and vitamin D3 21%. Girls also did not meet recommendations for energy intake (63.7% RDA), carbohydrates (57.7% RDA), fat (70.0% RDA) and polyunsaturated fatty acids (31.6% RDA). In comparison to RDA there was low intake of Ca (55.1%), Mg (65.1%), vitamin D3 (27.3%) and Fe (56.3%). There was a statistically significant difference between genders in fulfilling recommendations for intake of energy ($p=0.053$), proteins (<0.001) and Fe (<0.001).

Conclusion: This study shows inadequate dietary intake in children and adolescents attending primary and secondary school in Zagreb. The recommended daily requirements of investigated nutrients are not achieved except for vitamin B1 and Fe in boys and vitamin B1 in girls. This correlates with data on the most common nutrition deficits in the adolescent period which includes Ca, Fe and Mg. Statistically significant differences between genders in meeting the needs of energy and protein intake may be explained by awareness of the physical appearance and muscle mass build up, while low intake of certain micronutrients (Fe, Mg, vitamin D3) can imply on lower quality of adolescent diet.

Keywords: diet; children; adolescents, requirements

LIFESTYLE PROGRAMME FOR IMPROVING PREGNANCY OUTCOMES IN WOMEN WITH OBESITY – SLOVENIAN PILOT STUDY

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Introduction: The aim of this study is to develop a preventive programme for lifestyle changes of pregnant women with body mass index (BMI) > 30 at the moment of pregnancy confirmation. Pregnancy is considered as an optimal time for making such changes, which lead to a healthier lifestyle. Consequently, in the case of pregnant women with BMI > 30 at the moment of pregnancy confirmation, such changes are expected to improve health of mother, foetus, baby, family, and finally society as a whole. Important changes in the lifestyle of such women may be achieved using combination of health education, physical activity, appropriate nutrition, and psychological support. Therefore, together with the gynaecologists, physiotherapists, nutrition specialists, and psychologists, an appropriate programme is being prepared.

The aim of the research is to determine the influence of nutritional and psychological treatment as well as physical activity on the development of body mass during pregnancy and consequently on maternal and perinatal results of pregnant women with BMI > 30 at the moment of pregnancy confirmation. A basic hypothesis that despite different opinions, pregnancy can be considered as an appropriate period for making fundamental lifestyle changes of pregnant women is being analysed.

Materials and methods: To achieve the objectives of the research, randomized, prospective, and interventional clinical study is performed. Approximately 25 pregnant women with BMI > 30 at the moment of pregnancy confirmation and single-pregnancy of an arbitrary age are included in the study. However, the following excluding criteria have to be fulfilled: multi-pregnancy, high-risk pregnancy, and the presence of acute and chronic infections of pregnant women. The first treatment of pregnant women will be performed in a period between pregnancy confirmation and nuchal translucency scan. At least three visits of previously mentioned professionals are performed for all the women, ideally one visit in each trimester of pregnancy. Various questionnaires are also prepared (FFQ, questionnaire about eating habits, 24-h dietary recall, physiotherapist questionnaire about physical activity, Beck depression inventory).

Conclusion: Fundamental changes in lifestyle of pregnant women with body mass index BMI > 30 at the moment of pregnancy confirmation can be achieved with a suitable physical activity, and appropriate and healthy nutrition which finally lead to a normal BMI values during and after their pregnancy. Using a proper treatment, such pregnant women can increase their physical condition, reduce their BMI and associate complications, and enjoy their pregnancy.

Keywords: Pregnancy, Obesity, Lifestyle, Body mass index, Nutrition

HYDRATION – DOES IT AFFECT BODY WEIGHT?

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Introduction: Obesity has been one of the biggest health challenges affecting all ages and both genders around the world. According to the World Health Organisation statistics there were more than 1.9 million overweight adults and 650 million obese adults in 2016. The same year 41 million children under the age of 5 were found to be overweight or obese. The main objective of this study was to investigate whether there was an association between hydration and body weight among 4th grade university students studying Nutrition and Dietetics. It was also aimed to look at how much water/fluids were generally consumed and whether there were any dehydration symptoms.

Materials and Methods: Sixty students (49 women and 11 men), whose ages were between 21-30, were given a survey which included a beverage frequency questionnaire (BFQ) and a food frequency questionnaire (FFQ) to assess the intake of most frequently consumed water-rich fruits and vegetables. These were then analysed using nutrient analysis software. Body weight, height, body mass index (BMI), waist circumference and waist-to-hip ratio were measured. Students were also asked if they had experienced any of the twelve dehydration symptoms including thirst, dizziness, fatigue etc. Urine colour chart was used to evaluate hydration status of the students.

Results: Total fluid intake (TFI) from both beverages and fruits and vegetables has shown a significantly positive correlation with body weight and BMI ($p<0.05$) but not with waist circumference and waist-to-hip ratio. Comparing the TFI in men and women, no statistically significant difference was observed. The difference between the grades of the urine chart was also not found to be statistically significant. Among dehydration symptoms, only dizziness was found to be statistically significant with a negative association with TFI ($p<0.05$).

Conclusion: In overall, our results may suggest that 4th grade students have not shown any significant dehydration symptoms except for dizziness. Positive correlation of TFI with body weight and BMI may suggest higher consumption of sugary fluids, such as coke, than water itself. This study can be extended to include a more detailed BFQ and measurement of body fat using a more sophisticated device such as bio-impedance analysis in future research.

Keywords: Hydration, Total fluid intake, Body weight

NUTRITIVE PROFILING OF LUNCH MEALS IN PRIMARY SCHOOLS IN ZAGREB MUNICIPALITY WITH NUTRIENT RICH FOOD 9.3 INDEX

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Introduction: The nutritional value of institutionally organized diets could be determined by its meal components whose selection can be influenced by food procurement policy. Therefore, the aims of this study were to evaluate energy and nutrient density of the planned meals served by schools and to observe the differences between two public sector food procurement (PSFP) models.

Materials and methods: Nutritive profiling was made for 10 different lunch meals per school. One week of school lunches was randomly selected during fall/winter and one week during the spring/summer season. The study included 14 primary schools in the area of Zagreb municipality. Eight schools were subject to a public food procurement model which is based on the lowest price (LOW model), while six other schools were additionally buying local, organic and/or family-owned suppliers (LOC model). The nutrient density of each school lunch was estimated by the Nutrient Rich Food 9.3 Index (NRF9.3) and presented as points/100 kcal. Energy density was presented as the energy value per gram of meal. Lunch meals were grouped in 6 categories according to the main component (stews, risotto, pasta, fish dishes, meat dishes, and “other”).

Results: Based on NRF9.3 scores, stews (28.73) and “other” (55.08) food category emerged as the most nutrient-dense lunch meals in LOW and LOC models, respectively. There were no significant differences ($p=0.791$) between the two models regarding energy density (1.90 ± 0.07 kcal/g and 1.86 ± 0.06 kcal/g, for LOC and LOW, respectively). However, the average NRF9.3 score in the LOC school model (11.56 ± 1.43 points/100kcal) was significantly lower ($p=0.003$) than in the LOW model (18.79 ± 1.68 points/100kcal). No significant difference between the two models was observed when grouping the meals in 6 categories for energy density, but some difference was found regarding nutrient density of stew and meat dishes.

Conclusion: The overall nutritional quality of the school lunch is poor; hence the recipes should be revised to achieve more energy and nutrient dense lunches. It seems that the type of PSFP model could affect nutrient density. However, these differences are the result of different menu design between the schools and not the model itself.

Keywords: school lunches, nutritive density, energy density, public sector food procurement models

NUTRITIONAL RISK SCREENING IN CARDIOLOGICAL PATIENTS AT THE CLINICAL HOSPITAL CENTER RIJEKA

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Introduction: Poor nutritional conditions have in several studies been strongly associated with mortality in cardiological hospitalized patients. In addition, the prevalence of nutritional risk in hospitalized cardiological patients has been found to vary between 34 and 90%. The aim of this study was to estimate prevalence of nutritional risk in patients receiving to the Department of Cardiology of the Clinical Hospital Centre of Rijeka, for better recognition of the nutritional needs of patients and to reduce the prevalence of malnutrition.

Materials and methods: The nutritional status of 106 patients was evaluated on the basis of anthropometric and biochemical parameters and nutritional screening was performed using Nutritional Risk Screening (NRS-2002). The anthropometric parameters used in the research are: age, gender, body mass, body height, waist circumference, waist to hip ratio and body mass index. The biochemical parameters used in the study are: hemoglobin, urea, creatinine, serum albumin, cholesterol, HDL, LDL and triglycerides.

Results: The prevalence of nutritional risk according to NRS-2002 (score ≥ 3) was 14, 2 %. Statistically significantly higher risk of malnutrition had older patients ($p = 0.021$) and length of stay in hospital significantly affected the change in NRS status ($p = 0.009$). The NRS score after hospitalization was statistically significantly higher in patients who stayed in the hospital for more than 14 days. Comparison of anthropometric characteristics of patients before and after hospitalization showed that there were significant differences in body mass index and waist to hip ratios ($p < 0.0001$; $p < 0.0001$) while there was no significant difference in biochemical parameters ($p = 0.200$).

Conclusion: Screening of nutritional risk of patients provides greater choice and implementation of the necessary nutritional support which is an important segment in treatment of hospitalized cardiological patients and an important factor in reducing the development of malnutrition.

Keywords: cardiological patients, malnutrition, NRS-2002, nutritional risk.

THE IMPORTANCE OF A NUTRITIONIST-PLANNED DIET IN INFLAMMATORY BOWEL DISEASE TREATMENT

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Introduction: Inflammatory bowel disease (IBD) is a chronic immune mediated, relapsing bowel disease. IBD incidence increases in developed countries. Recent findings suggest that IBD may have a multifactorial etiology: interactions between genetics, environmental factors, and host immune system. The aim of this paper is to analyze the number of hospitalizations of IBD patients treated at the Zadar General Hospital (ZGH). For the final confirmation of IBD diagnosis, the correlation of clinical status, endoscopic and pathohistological findings is important.

Materials and Methods: We analyzed the number of hospitalizations and the number of hospital days between 2009-2018 in ZGH, of patients diagnosed with K50-Crohn's disease and K51-Ulcerative Colitis (International Classification of Diseases, 10 revisions).

Results: From 2009-2018 there were 4.391 hospitalizations (2 272 men, 2 117 women) reported in the ZGH by diagnosis K50 and K51. The median age of patients was 41 years (min 5, max 90); 37 males (min 5, max 89); 45 females (min 12, max 90). In the Stationary there were 892 hospitalizations (48% men, 52% women) with 3 162 days of hospital treatment. The median length of treatment was 1 day (min 1, max 63). In the Day Hospital, there were 3 499 hospitalizations (53% men, 47% women). During the observed period, there was a continuous increase in the number of hospitalizations, partly associated with the bigger number of people diagnosed with IBD, and partly due to the implementation of new treatment guidelines and the introduction of biological therapy. In 2009 there were 83 hospitalizations (38 patients), while in 2018 there were 1 068 hospitalizations (126 patients). Since 2015, when the Day Hospital of the Department for Gastroenterology began working, most patients have been treated in that way.

Conclusion: Hospitalization due to IBD has a rising trend in the ZGH and should be further researched. Apart from therapy given by gastroenterologists, the important role in the care for patients with IBD is a proper personalized diet. According to the recent studies, adequate nutrition can significantly affect the activation of immune cells and mediators through the process called immunonutrition. Planned meals can significantly affect the relationship between pathogenic and beneficial bacteria in the gut, and help establish good intestinal microflora after pharmacotherapy. To reduce the recurrent hospitalization, maldigestion and malnutrition, and to improve the quality of life of IBD patients, the appropriate diet administered by nutritionists is of great importance.

Keywords: Inflammatory bowel disease; hospitalizations; immunonutrition; diet; nutritionist

SUPPLEMENTS OF NUTRITION IN VIRUS INFECTION

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Introduction: Causes of viral infections are viruses, single cellular organisms that contain only DNA or only RNA surrounded by a capsule (capsomer). Viral infections are a pathogen of a state created by the passive or active action of the virus in the body. The consequences of a viral infection can be: cell death, cell transformation, and latent infection. In a latent (sleepy) infection, the virus does not lead to changes although it is present in the host cell. Viruses that lead to latent infections can be activated in the event of stress, immunity, or an increase in body temperature. In addition to conventional ways to treat viral infections, dietary supplements play a major role. In this paper, we have collected the literature data and give an overview of the most frequently used dietary supplements in viral infections.

Materials and Methods: A systematic review of literature analyzed studies and collected data on nutritional supplements in viral infections. The studies that were analyzed are available in the database Pub.med.. Based on the collected data, an overview of the most frequently used dietary supplements and biologically active ingredients on which the action is based is made.

Results: In viral infections, it is recommended to use vitamins based on vitamins (vitamin A, vitamin B6, vitamin C), minerals (zinc, selenium, magnesium, calcium, iron), antioxidants (beta-carotene, polyphenols, coenzyme Q10) (goat, aloe vera, bitter melon, bitter orange, cloves, green tea, Siberian ginseng, divers, kantarion, nettle, sugar, olives, turmeric), colostrum and royal jelly and propolis. Biologically active ingredients in plants are of a different chemical composition and wide spectrum of activity.

Conclusion: The use of nutritional supplements in viral infections is becoming increasingly common today due to their natural effects and very little or almost no effect. Herbal supplements take special place. Developing methods for identifying active ingredients and discovering the mechanism of their action will help develop new forms and methods of using dietary supplements in viral infections.

Keywords: viral infections, dietary supplements, viruses

DIFFERENCES IN DIETARY HABITS AMONG MEDICAL AND NON-MEDICAL FACULTIES IN NOVI SAD

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Introduction: During the study period, inadequate nutritional habits such as skipping breakfast, inadequate consumption of fruit, vegetables and dairy products and excessive consumption of fast food may develop. Understanding undesirable dietary patterns in adolescents is one of the measures in prevention of many diseases. The aim of this study was to estimate differences in dietary habits among students in medical and non-medical faculties at Universities in Novi Sad.

Materials and methods: The research was conducted in May 2018 and included 514 students aged from 19 to 24 (133 males and 381 females) from 4 faculties (Faculty of Medicine, Pharmacy, Faculty of Sciences and Faculty of Technology) whose study programs contain nutritional subjects. The original anonymous questionnaire was used. Questionnaire was purposely designed for this study and included 26 questions with the offered answers and the possibility of answering some questions. Questions were about gender, age, year, type of study, height and body mass, then questions about general eating habits and life habits. Statistical processing was done in SPSS20.

Results: Results showed that 50% of students have 3 meals and only 10% have all 5 meals during the day. Students from Faculty of Technology in the large percentage (12%) constantly eat during the day in comparison with other faculties (4-5%). One half of students have breakfast every day, while a little less than 5% never has breakfast. Regarding food types, only 5% of the participants consumed vegetables and only 6% of them consumed fruit more than once a day with statistical significance between faculties ($p < 0.01$). At the same time, 92% of participants consumed meat a few times a week and 77% of participants consumed fish at least once a week. Daily water consumption higher than 2 L was reported by only one third of the students (faculty differences were statistically significant $p < 0.05$) although 85% of participants reported water as their first choice of drinks.

Conclusion: Results indicate presence of differences in dietary habits among students from different faculties. Study programs which contain nutritional subjects should focus to increase accepting proper nutritional habits among their students.

Keywords: students, dietary habits, Novi Sad

IS THERE AN ASSOCIATION BETWEEN PASTRIES CONSUMPTION FREQUENCY AND BODY MASS INDEX IN ADULTS?

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Introduction: Overweight and obesity are considered to be one of the major health problems in the modern world. The consumption of energy-dense, nutrient-poor food such as pastries is often being associated with enhanced energy intake and poorer compliance with healthy eating guidelines. The aim of this research was to test the hypothesis that a higher pastries consumption frequency is associated with a greater body mass index (BMI) in adults.

Materials and Methods: This cross-sectional study included 132 adult subjects, aged 18 - 65. Subjects were recruited by word-of-mouth. Pastries (puff-pastries, bagels, donuts) consumption frequency over the past month was assessed using the validated semi-quantitative Food Frequency Questionnaire. The BMI was calculated using self-reported body weight and height values. Data analysis was performed using the statistical software Statistica v. 6.1.

Results: Out of the total sample, 3.8% of the participants ate pastries on a daily basis, 7.6% ate them four to six times a week, 14.4% two to three times a week, 18.2% ones a week, 14.4% two to three times a month, 18.9% ones a month, while only 22.7% reported never eating pastries. Regarding the BMI, 52.3% of the participants had normal body weight, 33.3% were overweight, 10.6% were obese, and 3.8% were underweight. According to the results, the association between pastries consumption frequency and BMI was not statistically significant ($p > 0.05$).

Conclusion: The results of the present study imply that the studied food group has no prevalent influence on BMI, but this should be taken with caution due to the fact that the portion size estimate was not taken into account. Therefore, there is a need for long-term randomized trials that would elucidate the impact of pastries consumption on BMI.

Keywords: pastries, body mass index, adults

FREQUENCY OF PHYSICAL ACTIVITY AMONGST CHILDREN AGED 11-14 REGARDING THEIR NUTRITIONAL STATUS AND EATING HABITS

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Introduction: The lack of physical activity combined with inadequate diet has a negative impact on the growth of children. This paper aims to examine the frequency of doing physical activity amongst children aged 11 – 14 regarding their nutritional status and eating habits.

Materials and methods: The research, done in 2016, included 241 student of both genders, from three urban primary schools, aged 11 – 14 in the Municipality of Travnik. As measurement instruments, we used anthropometric measures (height and weight) and questionnaire (22 anonymous questions related to attitudes on food and lifestyle habits). Nutritional status evaluation was conducted based on percentile curves, ie. based on the calculated values for height and mass regarding the age. Statistical data processing was done with the statistical package SPSS 20.

Results: The results show that 68 (28.21%) students are doing physical activity on daily basis, 92 (38.17%) of them are doing it 2 – 3 times a week, 22 (9.13%) once a week, and 59 (24.48%) are not doing any physical activity ($X^2=42.037$, $df=3$, $Sig.=0.000$ $p=0.05$). Percentile curves show that 161 (66.80%) student has normal body weight, 52 (21.58%) students have increased body weight, 24 (9.59%) are obese, 3 (1.24%) are underweight and 1 (0.41%) is malnourished. The results $X^2=365.037$ $df=4$, $Sig.=0.000$ ($p=0.05$) show that there is statistically significant difference between respondents regarding their nutritional status. Out of total number of those who are doing the physical activity 2 – 3 times a week ($N=92$), 79 (85.86%) are those with normal body weight, while those who never do any physical activity ($N=59$) are obese 17 (28.81%) and have increased body weight 37 (62.71%). 97 (40.25%) students have breakfast before they go to school, 43 (17.84%) don't have breakfast, while 101 (41.91%) have breakfast only sometimes ($X^2=26.125$, $df=2$, $Sig.=0.000$; $p=0.05$). Amongst those doing physical activity 2 – 3 times a week ($N=92$), there is the biggest number of those having breakfast only sometimes before they go to school 62 (67.39%), where on the other hand there is the biggest number of those never having breakfast before they go to school (28 ili 47.45%) is amongst those never doing physical activity ($N=59$). Analysing the snack food, the results show that 95 (39.42%) students eat sandwiches, 50 (20.75%) eat candies, 84 (34.85%) eat fruit, and 12 (4.98%) eat nothing ($X^2=69.788$, $df=3$, $Sig.=0.000$; $p=0.05$).

Conclusion: In order to prevent chronic noncommunicable diseases which have causal link with eating habits and lifestyle, it is inevitable to act with modern methods of

promoting health and development of healthy lifestyles with special emphasis on schoolchildren and teenagers.

Keywords: nutritional status, percentile curves, eating habits, physical activities, primary school



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