

Linking nutrition research to practice...



# Message from editors...

#### Water and Health

"Water is life's matter and matrix, mother and medium. There is no life without water"

These were the thoughtful words of a Noble laureate Albert Szent Gyorgyi in 1937. Life on earth has evolved as a consequence of the presence of water.

Water is the most abundant molecule in the human body that undergoes continuous recycling. Numerous functions have been recognized for body water. It is a solvent, that captures and regulates body heat and is a regulator of cell volume and overall function. However, water is frequently overlooked as an important molecule in the sustenance of life.

Therefore, the importance of water for life is obvious, but its role in promoting human health has not been recognized adequately.

World Water Day is celebrated annually on 22nd of March. World Water Day raises awareness and inspires action to tackle the global water and sanitation crisis and it became a United Nation observance day since 1993. This year they focused on 'accelerating change to solve the water and sanitation crisis'.

According to WHO (2022), 1.4 million people die annually and 74 million will have their lives shortened by diseases related to poor quality water, sanitation, and hygiene. WHO/UNICEF (2021) said that 'Today, 1 in 4 people – 2 billion people worldwide – lack safe drinking water' and 'Almost half of the global population – 3.6 billion people – lack safe sanitation.'

Ensuring sustainable water management and access to safe drinking water, sanitation, and hygiene (WASH) to all is critical in fulfilling the United Nation's 2030 Agenda for Sustainable Global Development and securing a climate-resilient future. Water is not only crucial for the survival of humans and the planet, but affects the social, environmental, and economic requirements of a healthy and flourishing world.

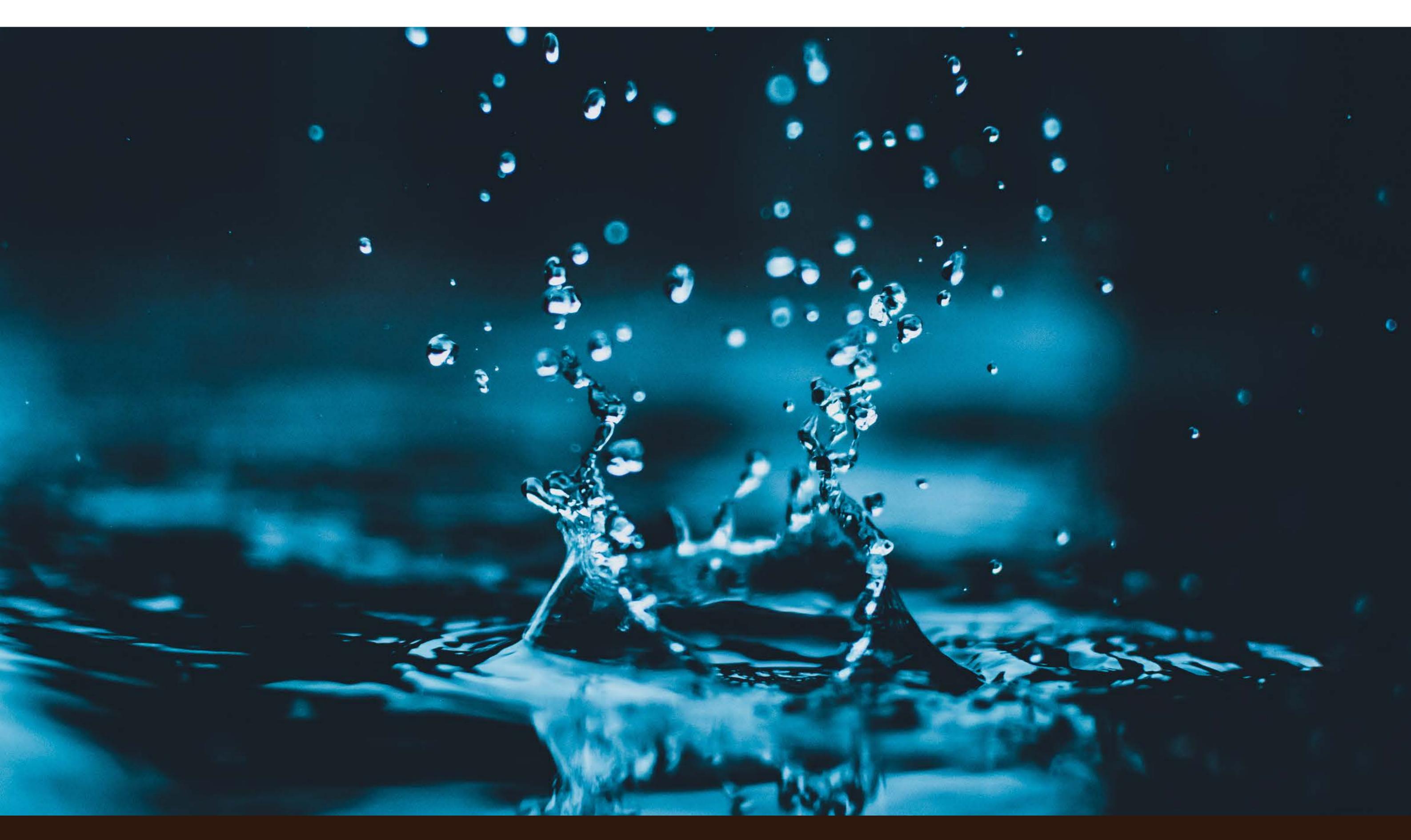
# Message from editors...

#### Water and Health

Economic losses related to water insecurity are estimated to be billions of US dollars per year. According to the Organization for Economic Co-operation and Development, this is due to inadequate water supply and sanitation, urban property flood damages, and due to water insecurity of existing irrigators. In addition, achieving clean water and sanitation targets, as detailed in the 2030 Agenda's Sustainable Development Goal 6, will continuously benefit the other Sustainable Development Goals, such as poverty reduction, sustainable food production, improved health and well-being, gender equality, provision of ecosystem services, transboundary cooperation and clean energy generation.

Consequently, protecting water and sanitation is very important in every area of our lives.

Until next time, Dr. Gayathri and Dr. Nishanthika



# CAPTURE OF THE MONTH



" In one drop of water are found all the secrets of all the oceans"

Factors associated with poor oral intake of fluids and water among elderly in-ward patients and preventive strategies

#### Dr. J.A.B.K. Wijerathna

Water is an essential component of the human body. It is required to maintain normal body metabolism. It comprises 75% body weight in infants to 55% in the elderly. About 60% of body weight in adult males, and 50 to 55% in females is water.

According to the "European Food Safety Authority panel," water requirement varies between individuals and according to environmental conditions. The individual water requirements depend on their caloric consumption, insensible water losses, and renal concentrating/diluting capacity. Due to that establishing an Estimated Average Requirement (EAR) and Recommended Dietary Allowance (RDA) for all the environmental conditions is not possible, only adequate intake (AI) was recommended for specific age groups. To calculate this value, they have considered 'water intake values among the population for desirable osmolarity levels of urine' and 'desirable water volumes per consumption of one energy unit.'

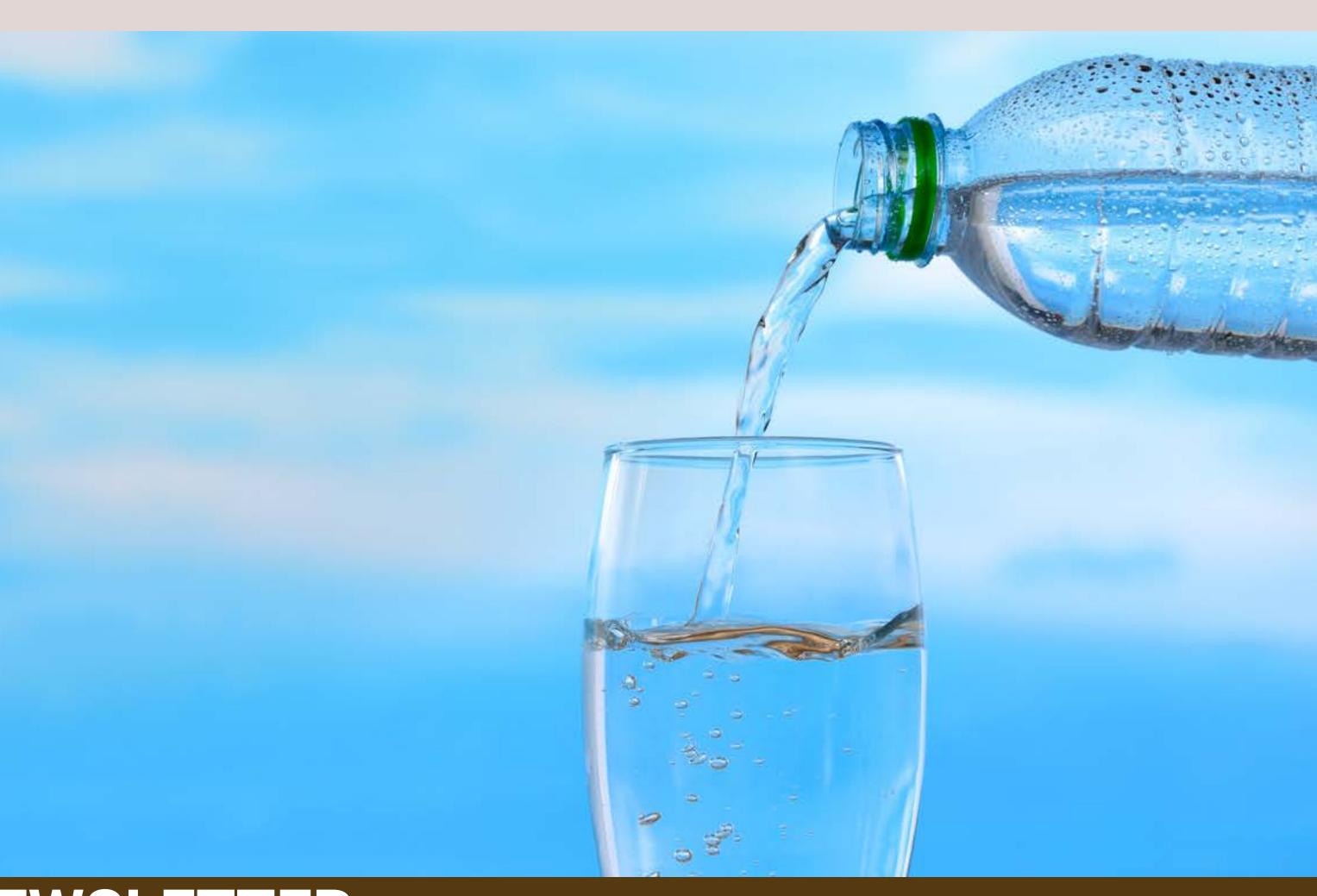
According to Food-Based Dietary Guidelines (FBDG) Sri Lanka, daily water intake should be 3.7 liters per day for men and 2.7 liters per day for women aged from 19 to 70+ years.



# Age-associated physiological changes in water homeostasis

The European Society for Clinical Nutrition and Metabolism (ESPEN) recommendation is that older males drink a minimum of 2.0 L/day and females 1.6 L/day. It is the only organization that distinguishes fluid recommendations between adults and older people.

Inadequate oral fluid intake is common among elderly in-ward patients. That can lead to a negative effect on patient well-being and recovery. The aging process leads to several physiological changes in the human body that can cause inadequate oral fluid intake and an increased risk of dehydration among elderly patients than the younger population.

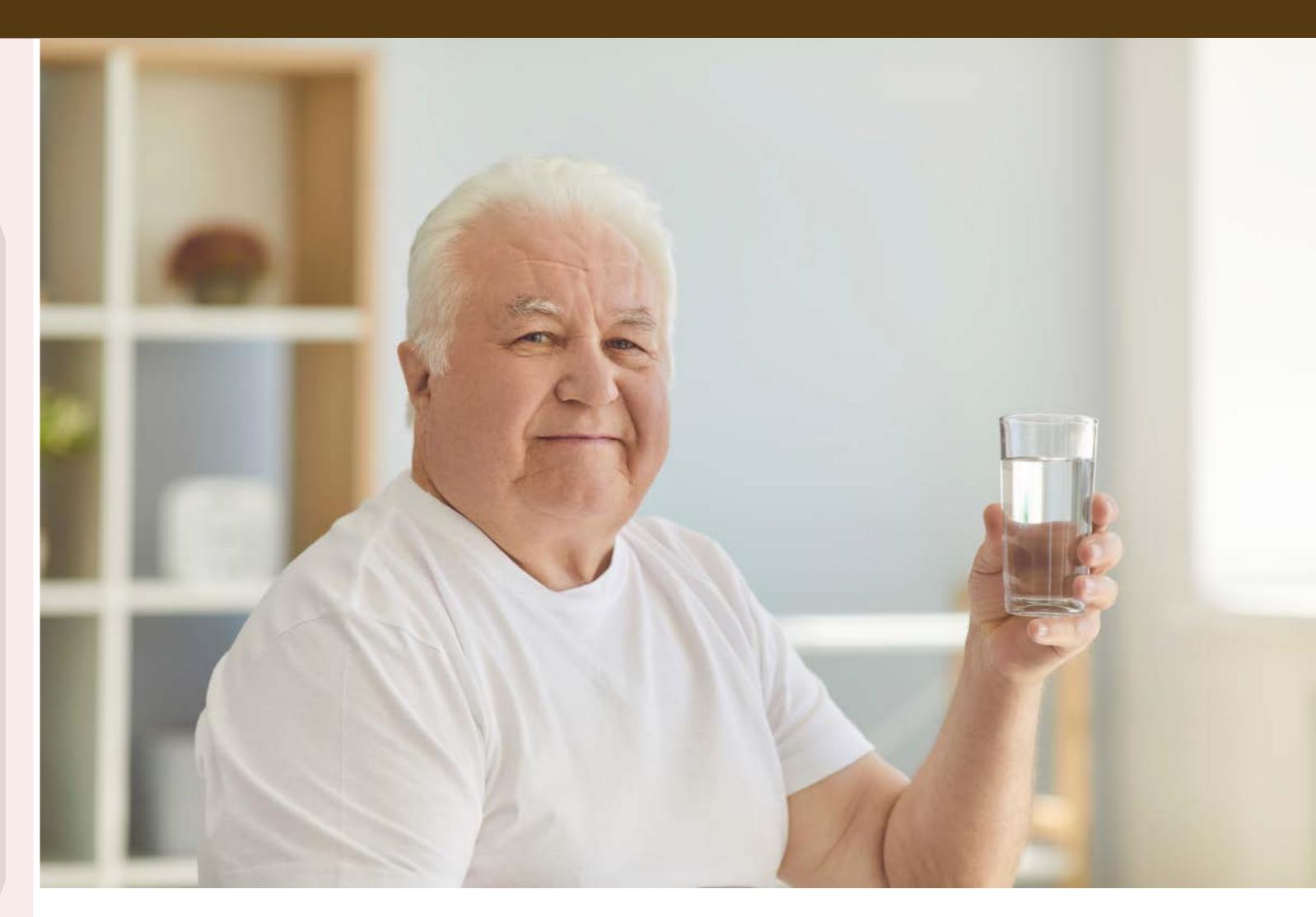


• In adults, fat-free mass contains approximately 70 to 75 percent of total body water, and adipose tissue contains only 10 to 40 percent of water. Aging leads to loss of lean body mass (LBM) and bone mass. That can relatively increase body fat mass. The loss of lean muscle mass decreases the water content of the body and increases the risk of dehydration.



Typical age-related changes in the kidney include loss of parenchymal mass, progressive glomerulosclerosis, tubulopathy, interstitial fibrosis, and the development of afferent efferent arteriolar shunts. At the age of 80, the normal kidney loses up to 25% of its mass which can lead to significant impairment of renal function. Impaired renal function can affect renal water and solute reabsorption and water conservation.

Aging leads to reduced secretion of renin and aldosterone which can affect the sodium reabsorption and water conservation ability of the kidney. The elderly also have increased plasma ADH levels. But aging kidneys show less responsiveness to ADH and have minimum effect on urine concentration.



The increased risk of dehydration is caused by the decreased sensation of thirst, reduced renal concentration ability, relative resistance to ADH in the kidney, decrease renin activity, and the low secretion of aldosterone.

# Factors contributing to poor water intake among elders

Most of the studies have shown that the daily fluid intake of older people in residential care homes is below the recommended daily requirement. According to a recent study, their average daily fluid intake was 1768.5 mL/day. The study revealed that 45% of them did not achieve EFSA fluid intake goals, and 34% of their intake was <1.5 L/day. Inadequate water intake contributes to suboptimal hydration and impaired quality of life and general well-being.

Elderly people may deliberately restrict their fluid intake to avoid the embarrassment and inconvenience of incontinence or difficulty in toileting. Side effects of medication (especially relevant for diuretics, laxatives, anticholinergics, or psychotropic drugs) and mobility disorders can also increase the risk of dehydration by increasing fluid losses and reducing intake.

Dysphagia and swallowing difficulties also can contribute to inadequate fluid intake. Swallowing can be affected by the presence of some common neurological diseases like Parkinson's disease, recurrent strokes, ALS (Amyotrophic lateral sclerosis), altered level of consciousness (exacerbated by medication), pharyngeal defects (Zenker's diverticulum), and cognitive impairments.

The typical geriatric issues (multimorbidity, polypharmacy, frailty) and other concurrent medical conditions (i.e., neurological, psychiatric, cardiopulmonary, and locomotor impairments) can lead to inadequate fluid intake. That can also cause increased fluid losses (i.e., gastrointestinal problems, incontinence, pressure sores, and diabetes mellitus) and the risk of dehydration as a consequence. Social isolation, lack of family support, and inadequate staff awareness/ training on hydration are other known contributory factors.

# Consequences of inadequate fluid intake in the elderly

The normal daily variation of body water is <2% of total body mass (~3% of total body water). Hypohydration is clinically defined as ≥2% body mass deficit. Dehydration is a well-known nutritional problem. It can be defined as depletion in total body water content due to pathological fluid losses, diminished fluid intake, or a combination of both.



Dehydration secondary to inadequate oral fluid intake contributes to significant morbidity and mortality among elderly patients. The major contributory factors for hypertonic dehydration are inadequate water intake and excessive water loss. Poor hydration status can cause several hydration-related medical complications among the geriatric population.

# Consequences of inadequate fluid intake in the elderly

#### 1.Physical performance

Dehydration with a fluid deficit of more than 1% can lead to reductions in exercise performance, thermoregulation, and appetite. A fluid deficit of more than 4% can cause more severe performance decrements with difficulties in concentration, headaches, irritability, sleepiness, and an increase in body temperature and respiratory rates. When fluid deficits continue to exceed 8%, death can occur.







#### 2. Cognitive performance

Mild levels of dehydration can cause easy fatiguability and disruptions in mood and cognitive functioning. Mild dehydration can lead to alterations of some important cognitive functions such as concentration, alertness, short-term memory, perceptual ability, discrimination, arithmetic visuomotor tracking, choice reaction time, and psychomotor skills. Dehydration is a known risk factor for delirium.

#### 3. Gastrointestinal function,

Inadequate fluid consumption can cause constipation. It can also lead to loss of appetite and poor oral intake.

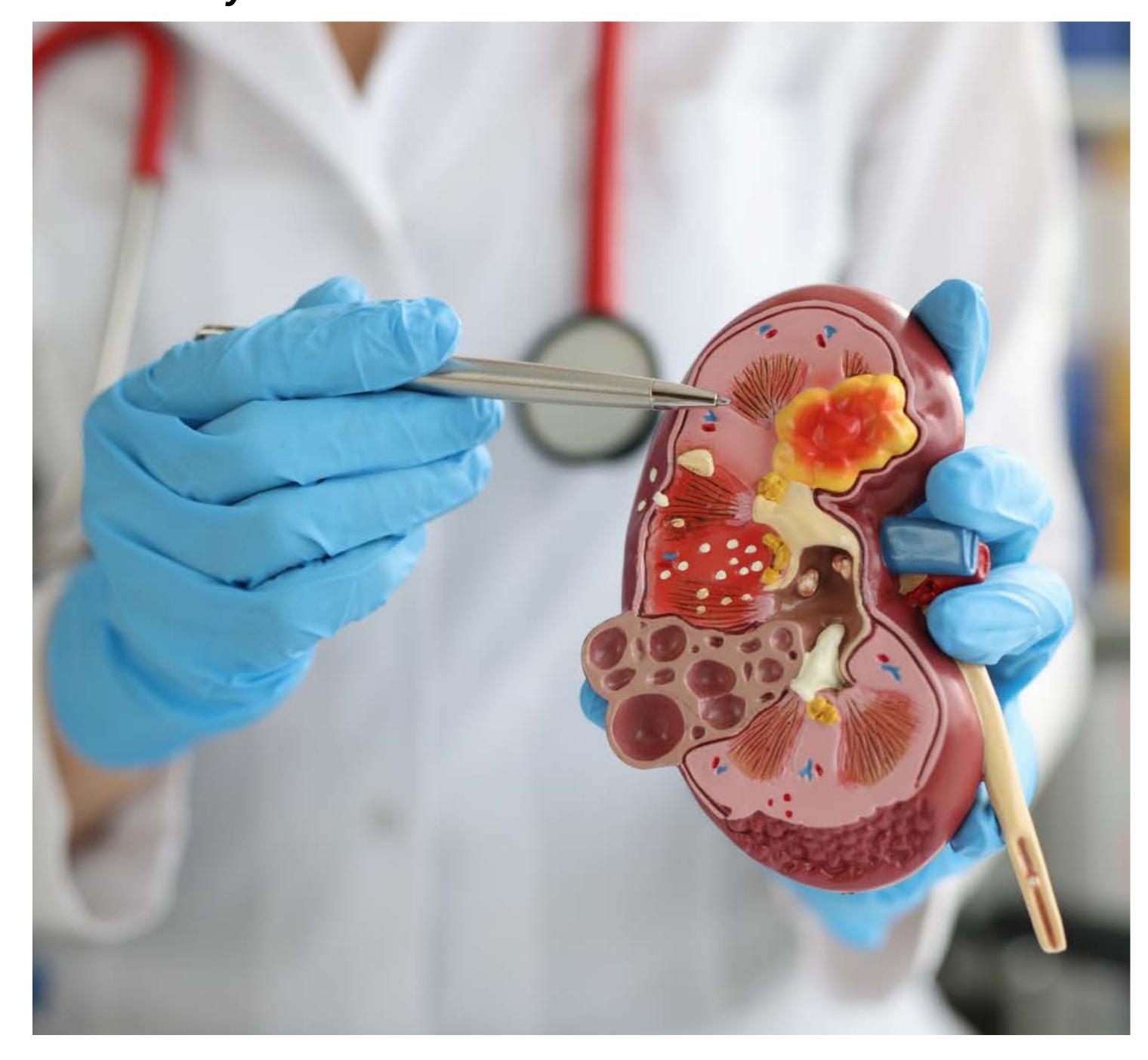
#### 4. Renal function

Observational studies report an association between low total fluid intake and a high risk for kidney stones. Chronic dehydration can increase the risk of infection, especially urinary tract infections. Higher fluid intake reduces the occurrence or recurrence of urinary tract infections. Dehydration is a significant risk factor for developing acute kidney injury (AKI). AKI has a mortality rate of 10-12%.

#### 5. Cardiovascular system

Dehydration increases blood viscosity and hematocrit. It is a known risk factor for intravenous and arterial thrombosis. Diagnosed patients with acute coronary syndrome (ACS) and hyperosmolarity experience longer hospital stays and increased risk of secondary renal injury and cerebral ischemic events. And they have increased cardiovascular mortality. Even mild dehydration may cause sudden cardiac death following ACS.

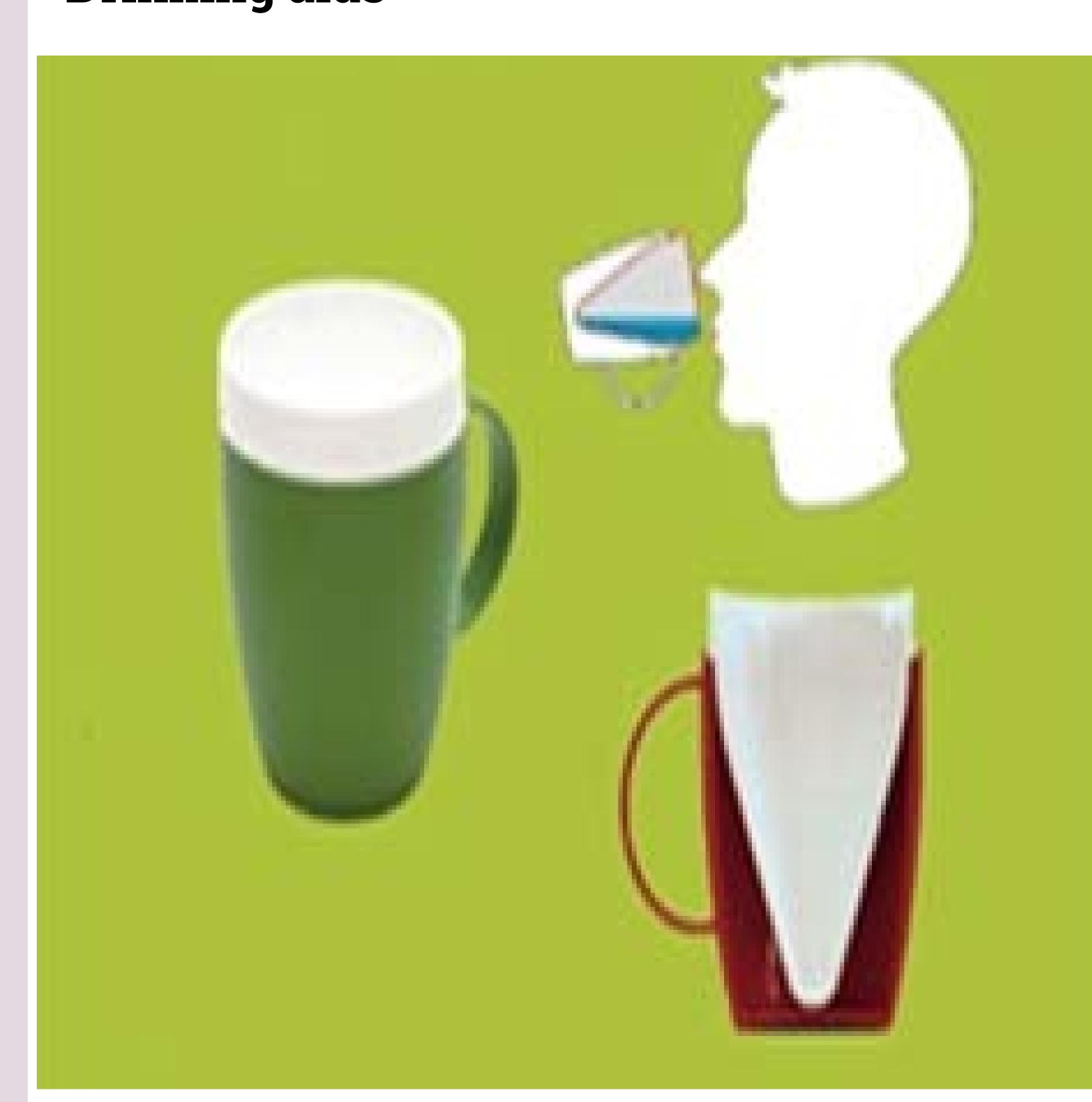
According to the latest evidence, drinking less than daily requirements (especially those who drink <1.0 L/day) can lead to the worsening of their concurrent chronic health problems. Optimum fluid intake prevents the occurrence of acute health problems among elderly people. That can reduce incidences of falls, fractures, pressure ulcers, and undernourishment. The mortality of patients with dehydration is seven times higher than those who are not dehydrated.



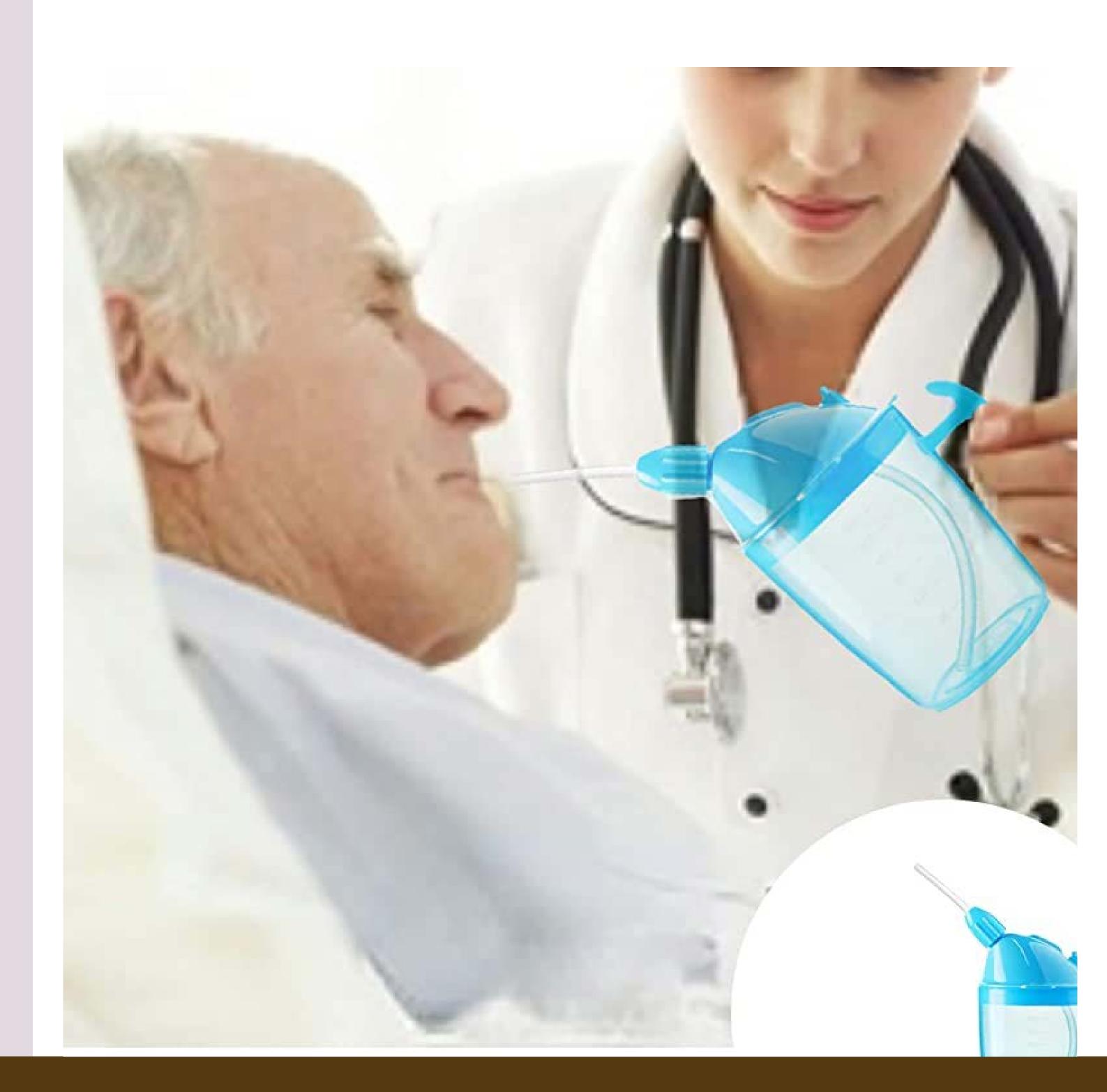
#### Strategies for Ensuring Good Hydration in the Elderly

- Arrange awareness and educational programs for caregivers and healthcare professionals on the importance of optimum hydration. Ensure all the staff is adequately trained in the management of hydration-related issues.
- E.g.: The "Hydration sticker education scheme study" was conducted in Hospital NHS Trust (CW), United Kingdom, in 2017. This study was a plan to improve oral fluid intake by using disposable hydration Stickers for patient bedside areas, patient notes, and cups. The introduction of this Hydration Sticker scheme addresses 91% of patients' hydration needs. As visual aids, Hydration stickers are considered an effective method. That promotes health staff and family members to encourage patients to increase oral fluid intake.
- Identify at-risk residents and use a specific indicator system (symbol) on atrisk patients' bedsides to keep staff alert on their hydration state. – E.g.: confused, refusing fluids, febrile, on diuretics. It is essential to maintain fluid intake charts for them.
- Investigate for osmolality, sodium, and or blood urea/creatinine ratio when blood is taken for other investigations.
- Guide them on the use of appropriate hydration aids and their availability. That can help to maintain their independence and reduce caregivers' burden. There are a lot of modern hydration aids. Hydration aids can facilitate adequate fluid intake for elderly people with disabilities

#### Drinking aids



There are different types of drinking aids. Patients with motor weaknesses or other disabilities can have difficulties using standard cups and mugs. They can easily use two-handled drinking aids to drink fluid. Elderly people with swallowing difficulties due to stroke, head injury, or neurological disabilities can use a mug with a cone-shaped interior.



#### Drinking aids

This hydration aid makes it much easier to drink without tilting their head backward. The Hydrant which provides liquid via a tube with a bite valve is a simple, cost-effective method for people with limited mobility, whether in bed or a chair. This tube opens under pressure and closes when released. This method is ideal for situations — such as hospitals and care homes. And this pressure valve system helps to provide an adequate amount of fluid for dependent people without any fluid leakage.



There is an increasing interest in preventive strategies for dehydration among in-ward and institutionalized elderly patients. friendly health care is one of the demanding fields in Sri Lanka. Sri Lanka is one of the fastest-aging countries in the world. According to the 2012 World Bank report, the above 60 years old population in Sri Lanka is expected to increase from 12.5% to 16.7% in 2021.

Inward and institutionalized elderly care and proper nutritional management can play a significant role in ensuring the wellbeing of elderly people and leads to a reduction in healthcare expenditure. Increasing awareness of the prevalence of inadequate fluid intake among elders and associated risk factors and adverse health outcomes can lead to early preventive measures which will ensure optimum fluid intake and better health outcomes

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#### By Dr. Farwin Ariff

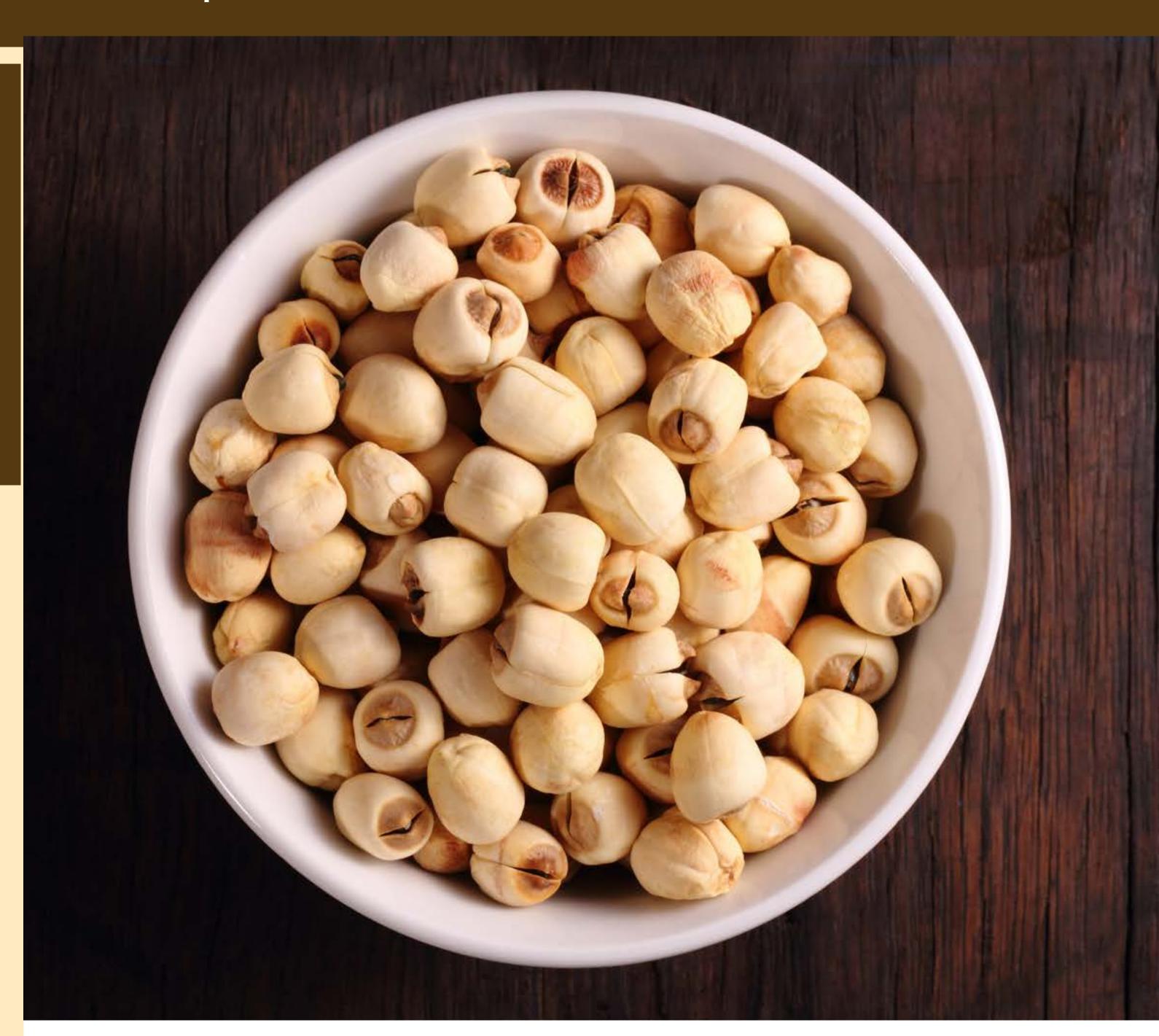
The Lotus plant is a perennial, freshwater plant. It is one of the most important aquatic plants. The lotus plant *Nelumbo nucifera gaertn* belongs to the family of Nymphaeaceae. It is also called by several other names including Indian lotus, Sacred lotus, and Chinese water lily.

This plant has been found along the bank of the river Nile since ancient times. It was brought to Assyriya from Egypt and spread to Persia, India, and China. It is a common plant in China, Japan, Iran, and Australia. It is commercially cultivated in China. It is commonly found in some parts of Sri Lanka.



Lotus roots and seeds were consumed by our ancestors for a long time. In Sri Lanka, we can widely see lotus plants in freshwater lakes and ponds in Anuradhapura, Polonnaruwa, and the Southern part of the island.

All parts of the plants are used for food and medicine. The seeds can be eaten raw, pickled, stewed, and fried.



Lotus seeds are very nutritious. It contains proteins, lipids, carbohydrates, vitamins, and minerals.

# Nutritional composition of dry lotus seeds per 100g

Name	Amount	Unit
Water	14.2	g
Energy	332	kcal
Energy	1390	kJ
Protein	15.4	g
Total lipid (fat)	1.97	g
Ash	3.99	g
Carbohydrates, by difference	64.5	g
Thiamin	0.64	mg
Riboflavin	0.15	mg
Niacin	1.6	mg
Pantothenic acid	0.851	mg
Vitamin B-6	0.629	mg
Folate, total	104	μg
Folate, food	104	μg
Folate, DFE	104	μg
Vitamin A, RAE	3	μg
Vitamin A, IU	50	IU

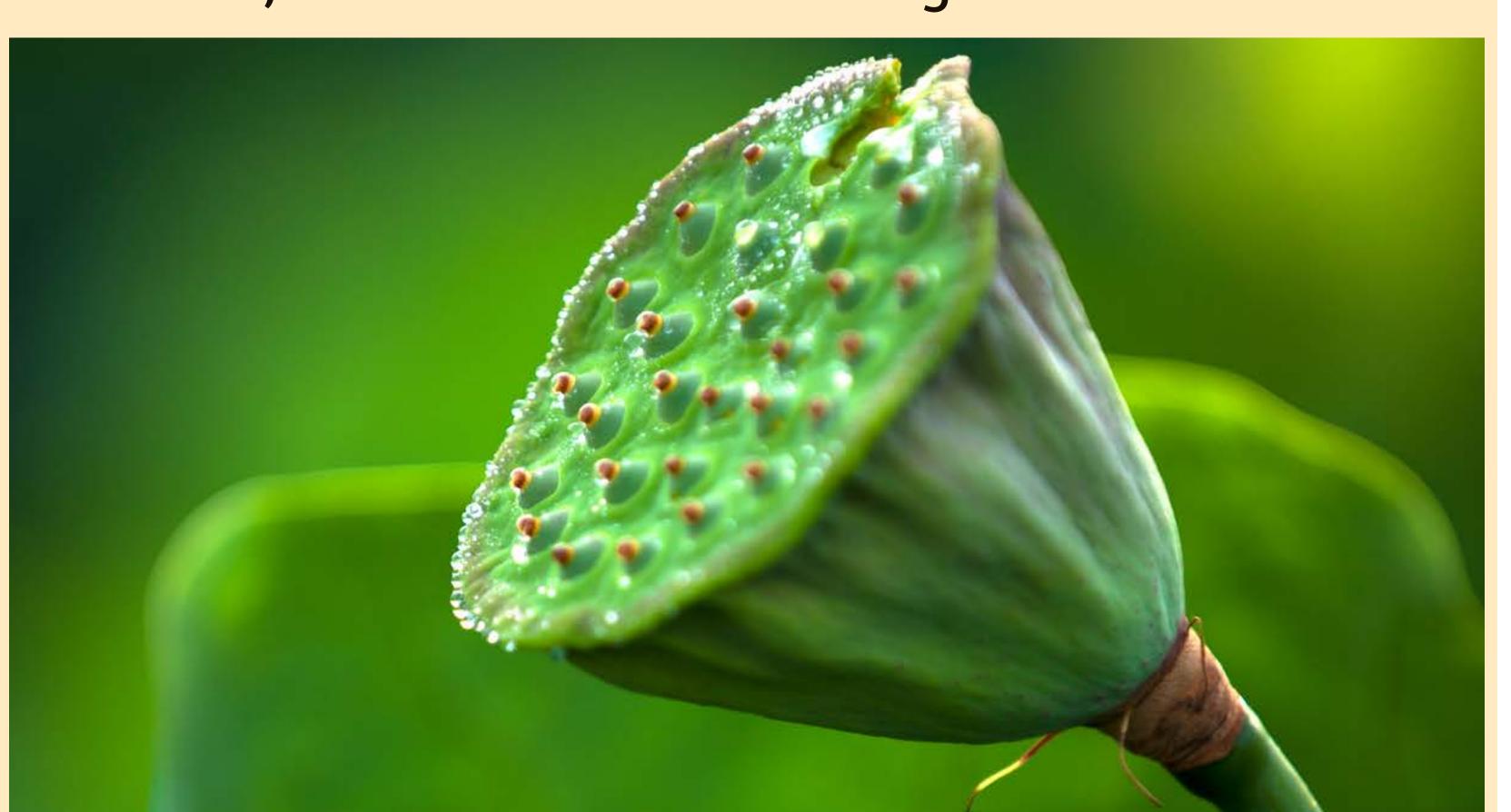


#### Health benefits of Lotus Seeds



#### **Antioxidant Activity**

Free radicals including hydroxyl radicals, superoxide anion, and hydrogen peroxide are involved in mediating several diseases. Free radicals induce oxidative stress, which is responsible for several diseases including diabetes, cardiovascular disease, respiratory disease, cancers and neurodegeneration



Lotus seeds contain high amounts of ascorbic acid, glutathione, and other bioactive substances with antioxidant potential. Lotus seeds extract has hepatoprotection, free radical scavenging properties, and antifertility properties. The acetone extract from lotus act as a natural antioxidant. Procyanidin and tannin are isolated from seed pods and have several pharmacological activities including lipid auto-oxidation, lipoxygenase, and free radical scavenging properties

#### Anti-ischaemic activity

Lotus seed exerts potent anti ischeamic effects in isolated rat heart. The effective dose of seed extract against ischeamia induced in isolated rat hearts was determined by measuring cardiac output.



#### **Anti-inflammatory properties**

Inflammatory mediators (such as nitric oxide - NO), interleukins, tumour necrosis factor –(INF-α), and inflammatory proteins like nitric oxide synthase and cyclooxygenase (COX-2) are secreted by cells like neutrophils, immune macrophages, and phagocytes during the external stimulus. Lotus seed extracts reduced the synthesis of pro-inflammatory cytokines, Tumour necrosis factor – a (TNF-α), and induced anti-inflammatory cytokine IL-10 in mice.

**Anti-Cancer Activity** 

Studies in a significant number of human and animal cell lines have provided evidence that lotus seeds and their biologically active compound exhibit anticancer activities toward nasopharyngeal carcinoma, liver cancer, lung cancer, cervical cancer, and retinoblastoma. Lotus seed extracts inhibit proliferation & metastasis and stimulate apoptosis & autophagy of cancer cells.

#### Role in gastrointestinal health

Lotus seed is used as a functional food to maintain the health of the human gastrointestinal tract. Lotus seed is a good source of resistant starch type 3 (RS3). It has possible probiotic activity. RS3 facilitates the fermentation of lactic acid to butyric acid by gut bacteria including Lactobacillus, Bifidobacterium, and Lachnospiraceae. RS3 regulates the absorption of minerals by the intestine reduces the effect of blood lipids and prevents colorectal cancer, mainly via short-chain fatty acids. Some studies show that lotus seed oligosaccharides (LSO) prevent constipation by stimulating the growth of beneficial micro-organisms in the



#### **Antidiabetic Potential**

Lifestyle changes and good habits can delay and control the onset of type II diabetic mellitus. Consuming natural and healthy foods with anti-diabetic properties could be an alternative strategy to treat diabetes with fewer side effects.

Resistant Starch (RS) is a natural product that has been reported to have the potential to control body weight and hyperglycaemic effects. An in vivo study demonstrated that the addition of 5%-15% of lotus seed RS to the diet in type II diabetic mice showed a protective effect by lowering blood sugar levels by 16% - 34%, increasing serum insulin levels by 25% - 39% and controlled lipid metabolism by reducing triglycerides by 25%.

Lotus seed powder improves insulin resistance, inhibits lipolysis, and prevents the insulin signaling pathway from being disrupted.



#### Other health benefits

Lotus seeds can increase the total white blood cell count and lymphocyte count indicating the possible immunological activity of the seeds.

The lotus seed extract was studied for the anti-amnestic activity of scopolamine-induced amnesia in rats. In vitro study reported that lotus seed embryo showed neuroprotective effects against glutamate-induced neurotoxicity in the HT22 cells.

Neferine is an alkaloid extracted from lotus seeds embryo. Neferine exhibited antiarrhythmic effects on rabbit sinoatrial nodes and cardiac myocytes from neonatal rats.

#### Health Benefits of Lotus Rhizomes (Root)

#### Antidiarrhoeal activity

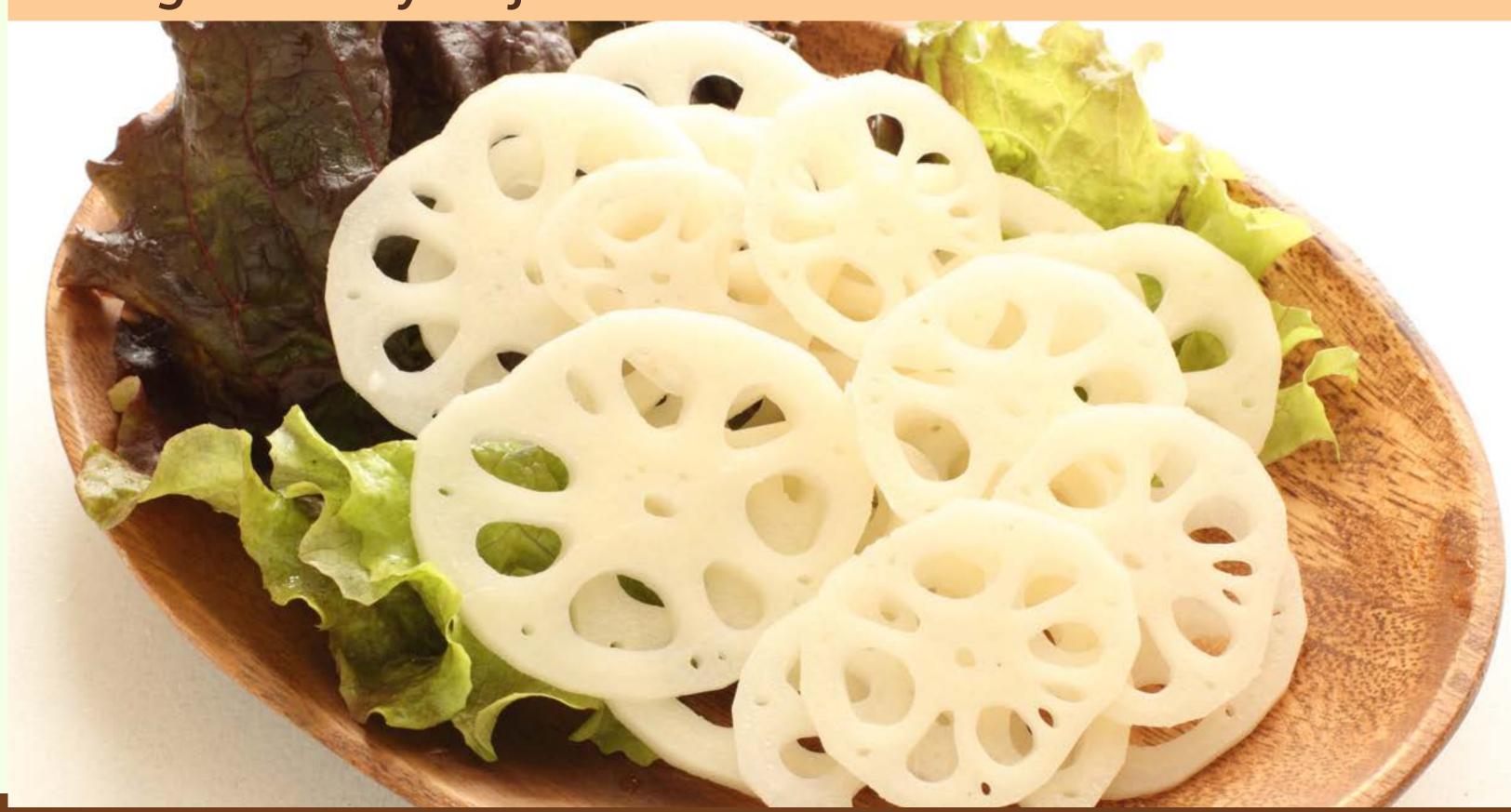
The antidiarrhoeal ability of lotus rhizome extract has been reported. A study was conducted to assess the effect of methanolic extract from rhizomes on its antidiarrhoeal activity in several experimental models of diarrhoea in rats.

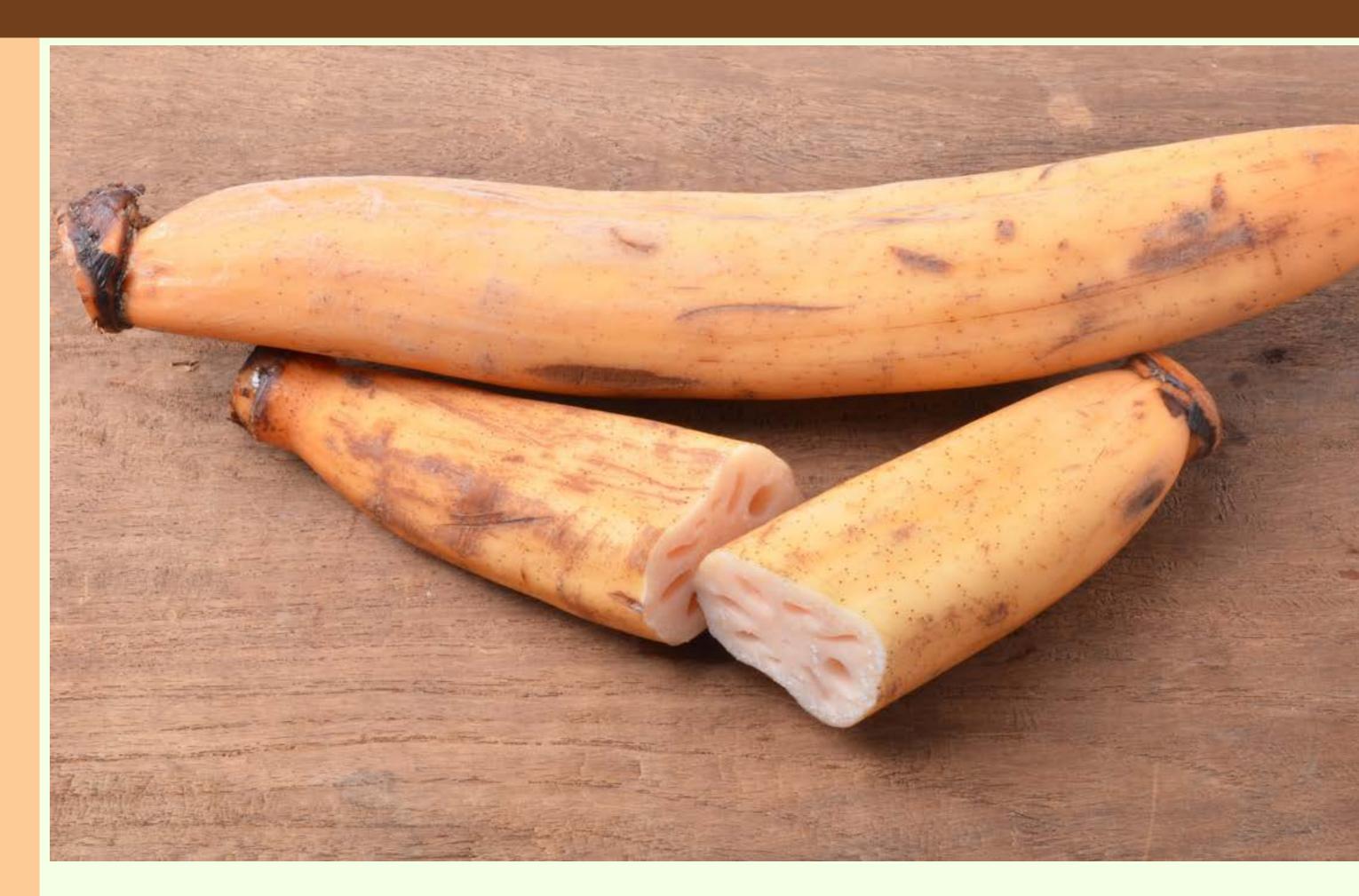
#### Nutritional Composition of Lotus root (per 100g)

Name	Amount	Unit
Water	76.26	g
Energy	79	kcal
Protein	1.94	g
Total lipid (fat)	0.93	g
Total dietary fiber	4.7	g
Soluble Dietary Fiber	1.84	g
Insoluble Dietary Fiber	2.86	g
Carbohydrates, by difference	14.67	g

#### Hypoglycemic activity

The oral hypoglycemic activity of the lotus was shown using a methanolic extract of the rhizomes. It significantly lowers the blood glucose level of normal, glucose-fed hyperglycemic, and streptozotocin-induced diabetic rats, when compared with controlled The extract enhances glucose animals. tolerance and improves the effect of exogenously injected insulin in normal rats.





#### vitamins

Vitamin D	0.27	μg
Vitamin K	44.45	μg
Vitamin E	0.73	μg
Thiamin	0.07	mg
Riboflavin	0.05	mg
Niacin	0.43	mg
Pantothenic Acid	0.2	mg
Total Vitamin B6	0.19	mg
Biotin	2.85	μg
Folate	26.49	μg
Vitamin C	26.63	mg

#### Antimicrobial activity

Various extracts of rhizome exhibited important anti-bacterial activity. antifungal and anti-yeast activities of the extract were assessed against five various strains of fungi and yeast. The effect was like that of the standard antifungal drug Griseofulvin which was used as a standard comparator

#### **Diuretic activity**

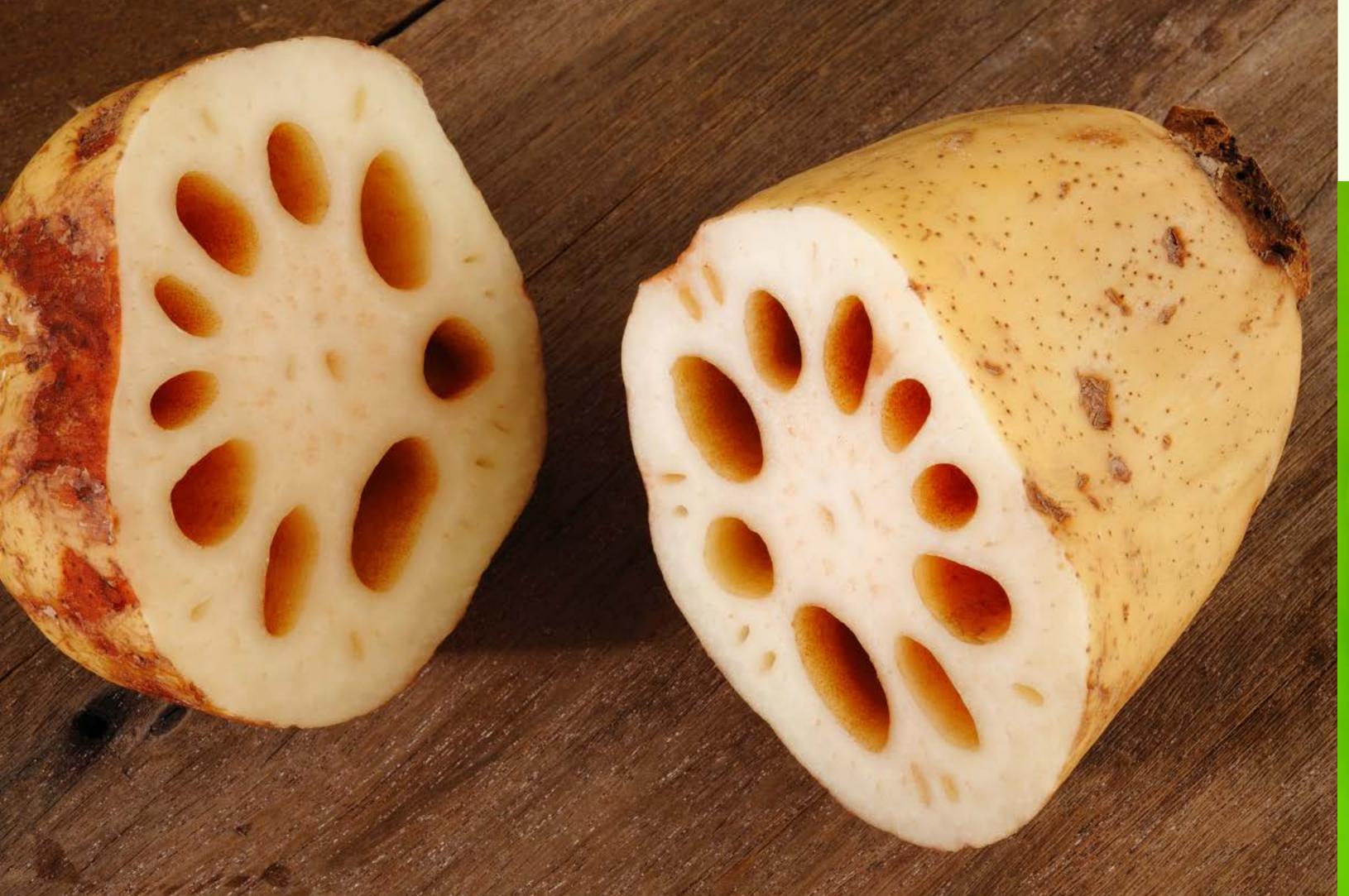
The methanol extract of rhizome produced a significant diuresis effect in rats. Urine output increases in a dose-dependent manner. Increased urine output was less standard diuretic furosemide than (20mg/kg).

#### **Anti-Inflammatory Activity**

The anti-inflammatory activity of the methanol extract of rhizomes and Betulinic acid was assessed on carrageenan and serotonin-induced rat paw oedema. This study exhibited significant anti-inflammatory activity.

#### **Anti-Inflammatory Activity**

The antioxidant activity of methanol and acetone extract of the rhizome was shown in short in-vitro studies. The methanol and acetone extract highest DPPH (2-diphenyl-1-picrylhydrazyl) scavenging activity. The methanol extract showed a greater antioxidant activity than ascorbic acid.



#### **Anti-pyretic Activity**

The antipyretic effect of methanol extract was demonstrated in rats with yeast-induced fever. Oral administration of the extract significantly reduced normal body temperature in a dose-dependent manner.



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# Past events since last publication

## SLMNA Monthly Council Meetings

SLMNA monthly council meetings were held on the 2nd of March and 3rd of April 2023 at the Medical Nutrition Unit of the National Hospital of Sri Lanka, Colombo as a hybrid event through the Zoom platform.

# SLMNA Monthly clinical Meetings







SLMNA monthly clinical meeting for the month of March was done by Prof. Ranil Jayawardena on "Update on Obesity Management". It was held on the 30th March 2023 at Neurotrauma Auditorium, NHSL.

## Past events since last publication

# SLMNA Monthly clinical Meetings



SLMNA monthly clinical meeting for the month of April was done by Dr.Sanjeeva Gunasekara on "Nutritional considerations in Children with hematological malignancies". It was held on the 20th of April 2023 at Auditorium, Apeksha Hospital, National Cancer Institute, Sri Lanka.

# Past events since last publication

### SLMNA bimonthly clinical Meetings (International)

SLMNA bimonthly clinical meeting lecture by foreign speaker Prof. Gil Hardy, emeritus Professor of clinical nutrition, Auckland, New Zealand on 'Fistuloclysis, Distal Feeding, and Chyme Reinfusion' was held on 28th of March 2023 through the Zoom platform.



# Fistuloclysis, Distal Feeding and Chyme Reinfusion



PROFESSOR GIL HARDY EMERITUS PROFESSOR OF CLINICAL NUTRITION AUCKLAND **NEW ZEALAND** 

12 PM- 1 PM MARCH 28<sup>TH</sup>, 2023 HTTPS://US02WEB.ZOO M.US/J/83609513999? PWD=VGHRMGNYEGU 5YUXHWC90QMIWWT DIZZ09

# Past events since last publication

# **Obesity Day Events**





An awareness programme for NHSL staff regarding lifestyle modification for obesity was held on the 3rd of March, 2023 at Neuro trauma Auditorium to commemorate World Obesity Day. Dr.Nalinda Herath, Consultant Nutrition Physician, NHSL, addressed the hospital staff regarding the nutrition and life style modification to combat obesity.

# Past events since last publication

## Obesity day events

The Medical Nutrition Unit of Lady Ridgeway Hospital for children in collaboration with the Sports medicine unit and the Health Education Unit, conducted an onsite awareness programme on obesity ,in keeping with world obesity day celebration conducted on the 4.03.2023. Awareness on obesity and exercises that can be done in the household were demonstrated to carers of OPD patients. It was well received by the crowd.



# Past events since last publication

# Obesity day programmes

Obesity day program at Negambo Hospital.



# Past events since last publication

#### 'Medicare National Health Care Exhibition 2023'

'Asia Wellness Forum' together with 'Aitken Spence Conventions & Exhibitions' under the patronage of the 'Ministry of Health' organized 'Medicare National Health Care Exhibition 2023' from the 3rd to 5th of March 2023 at BMICH, Colombo. SLMNA was allocated a stall at the Exhibition.



# Past events since last publication

# Women's Day program

The women's Day program at NTS, Colombo was held on 8th March 2023.



# Past events since last publication

#### Workshop for ICU nurses at PBCN was held on 9th of March 2023



# Past events since last publication

## Peripheral activities

'Healthy diet for prevention of NCDs' A workshop organized by the NCD unit of Kalutara RDHS and Ministry of Health in 20/03/2023. Discussion on 'How to improve nutrition to prevent NCDs during economical crisis' was done by Dr. Chapa Wijesena, MO- Nutrition at BH Panadura



# Past events since last publication

# Peripheral activities

'How to improve Nutrition in families via mother support groups' lecture discussion by Dr. Chapa Wijesena, MO Nutrition-Panadura Hospital was held on 22nd of March 2023 for staff members representing MOH areas of Kaluthara District. It was organized by the MCH unit of RDHS Kaluthara.



# Past events since last publication

# Peripheral activities

Awareness programme "POSHYA" for school children in grade 6,7,8 of St. Fransis college Dalugama was done by Dr.Gayathri Fernando. This was organized by Rotaract Club, University of Kelaniya on 28/03/2023.









# Past events since last publication

# Peripheral activities

Awareness programme on 'how to improve health and nutrition in children in an orphanage setting' was done by Dr.Chapa Wijesena at Prajapathi Government Centre for Enrolling Children, Panadura on 30/03/2023



# Past events since last publication

# Peripheral activities

'How to approach children with poor weight gain' A lecture-discussion to midwives in Mathugama MOH area on 19/04/2023 by Dr. Chapa Wijesena (MO Nutrition- BH Panadura)



## Upcoming Events

• Highlights from ASPEN 2023 will be held on 29th and 30th of April 2023 at JieJie Beach by Jetwing, Panadura.

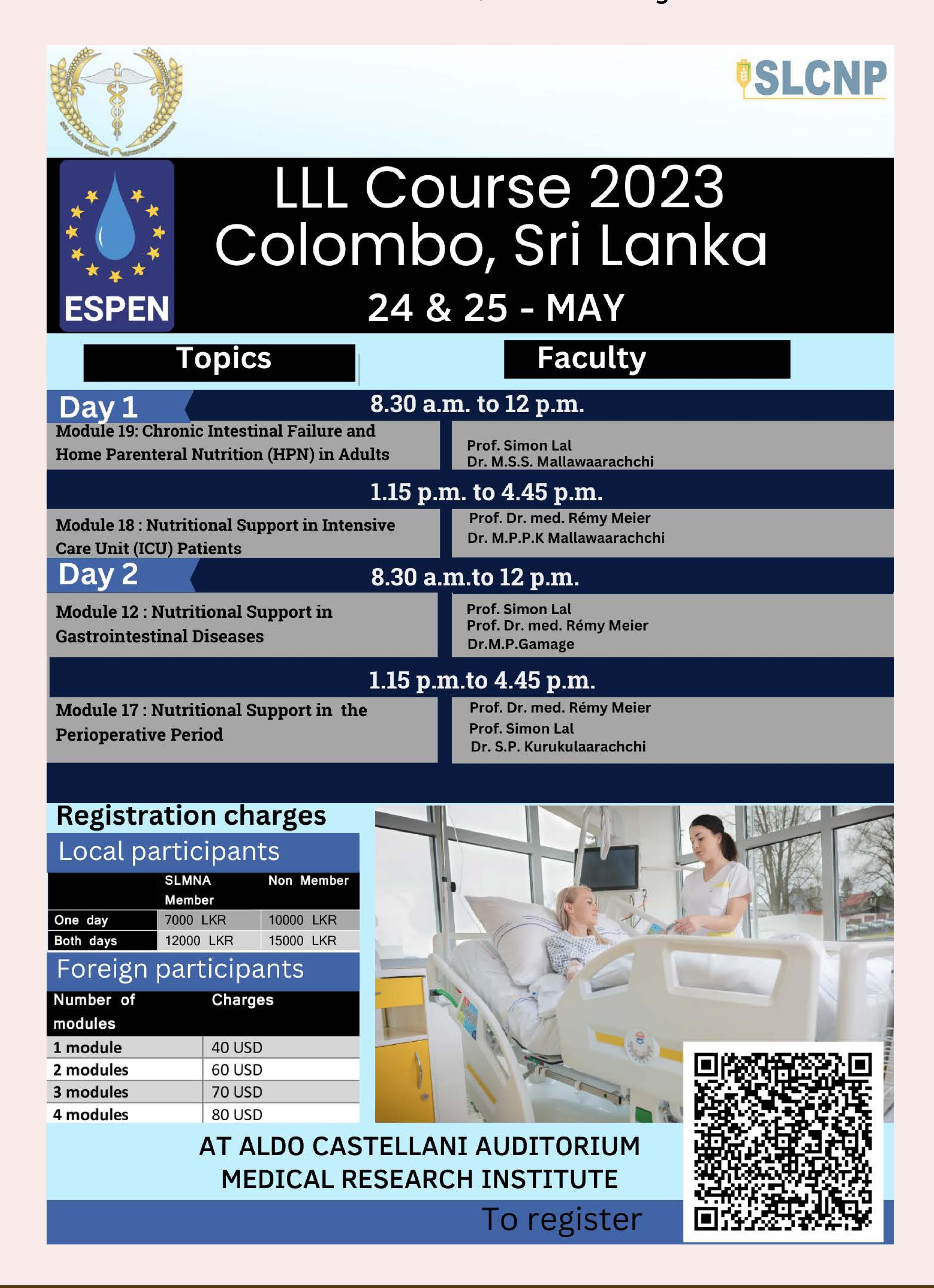


- Market Fair organized by SLMNA will be held on the 12thof May 2023 at Clover Banquets and Resorts, Gonawala, Kelaniya.

  Click here to register:
  - https://docs.google.com/spreadsheets/d/1HZzqFwMzTmHxwMSJCw4pmwQF8VOQ9wZRgUEUW89MsVc/edit?usp=sharing
- The next Monthly Clinical meeting will be held at NCTH, Ragama on the 15th of May 2023. It will be on Liver transplantation and nutrition considerations by Prof Rohan Siriwardena.

# **Upcoming Events**

ESPEN, 'Life Long Learning (LLL) Course 2023 Colombo, Sri Lanka' will be held on the 24th and 25th of May 2023 at Aldo Castellani Auditorium, Medical Research Institute. Scan the QR code to register.





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