Nutrition in Chronic Diseases: from Bench, Bedside, Epidemiology toward Healthier Life

ISCMCN 2012
THE 7th INTERNATIONAL SYMPOSIUM AND THE 10th INTERNATIONAL COURSE ON METABOLISM AND CLINICAL NUTRITION (ISCMCN) FKUI 2012
1. 2003
   FKUI
   The 1st International Course on Metabolism & Clinical Nutrition (ICMCN) FKUI 2003

2. 2004
   FKUI
   The 2nd International Course on Metabolism & Clinical Nutrition (ICMCN) FKUI 2004

3. February 13 – 16, 2005
   Acacia Hotel, Jakarta
   The 3rd International Course on Metabolism & Clinical Nutrition (ICMCN) FKUI 2005

4. February 18-20, 2006
   Borobudur Hotel, Jakarta
   The 1st International Symposium & The 4th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2006

   Borobudur Hotel, Jakarta
   The 2nd International Symposium & The 5th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2007

   FKUI, Jakarta
   The 3rd International Symposium & The 6th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2008

7. February 12 – 15, 2009
   FKUI, Jakarta
   The 4th International Symposium & The 7th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2009

8. February 18 – 21, 2010
   FKUI, Jakarta
   The 5th International Symposium & The 8th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2010

   Shangrila Hotel, Jakarta
   The 6th International Symposium & The 9th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2011; “Optimizing Nutrition to Prevent and Treat Malnutrition: Marine Products as an Alternative Modality”

10. February 18 - 19, 2012
    Le Meridien Hotel, Jakarta
    The 7th International Symposium & The 10th International Course In Metabolism & Clinical Nutrition (ISCMCN) FKUI 2012 : “Nutrition in Chronic Diseases: from Bench, Bedside, Epidemiology toward Healthier Life”
ISCMCN 2012

Nutrition in Chronic Diseases: from Bench, Bedside, Epidemiology toward Healthier Life

Editor:

Pramita G. Dwipoerwantoro
Marcellus Simadibrata
Saptawati Bardasono
Diana Sunardi
Welcome Message

Dear Colleagues,

Welcome to Jakarta, to the 7th International Symposium & The 10th Course on Metabolism and Clinical Nutrition (ISCMCN) FKUI which is an annual Symposium and Course conducted by the Continuing Medical Education/Professional Development Unit (CME-PDU), Faculty of Medicine of Universitas Indonesia (FKUI) as part of Dies Natalis of FKUI. This is an international annually event, which is conducted by FKUI, Université Joseph Fourier (Grenoble, France) and Université d’Auvergne (Clairmont-Ferrand, France).

This year ISCMCN theme is bringing “Nutrition in Chronic Diseases: From Bench, Bedside, Epidemiology Toward Healthier Life”. Chronic diseases are diseases of long duration and generally slow progression. Disease rates from these conditions are accelerating globally, advancing across every region and pervading all socioeconomic classes. By 2020 their contribution is expected to rise to 73% of all deaths and 60% of the global burden of disease. One of the strategies, beside promotion and prevention, is treating effectively, using latest available knowledge. ISCMCN supports this strategy by bringing basic scientific research to practicable diagnostic procedure and therapies with meaningful improvements in physical, mental, or social health outcomes to the medical practitioners, and at the end to the population.

Under this theme, the symposium and workshop will definitely bring you the updated and comprehensive information of nutrition in some chronic diseases. Many thanks and congratulations to those who contribute as speakers and contribute to the proceeding book of this symposium. We are welcoming you all at ISCMCN 2012.

With sincere best wishes,

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Zinc and Antioxidant Status of Children with Persistent Diarrhea

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Abstract

Despite great advances in the management of diarrheal diseases, persistent diarrhea remains a major problem especially in developing countries like Indonesia. Globally and from the Indonesia House Hold Health Survey (Survey Kesehatan Rumah Tangga, SKRT) 2007 showed that the annual mortality rate of children with diarrhea still high. It is widely recognized that direct loss of nutrient, including micronutrient, is an important mechanism through which diarrhea causes malnutrition. Persistent diarrhea due to its syndrome nature, leads to reduce absorption of all nutrients with their subsequent loss in the increased intestinal secretion and stools. This condition could lead to a negative zinc balance and antioxidant status, such as glutathione peroxidase (GPX), if the nutritional status becomes worst.

Keywords: micronutrient deficiency, glutathione peroxidase (GPX), malnutrition

Introduction

Despite substantial reduction in diarrhea mortality over recent decades, diarrhea and its reciprocal relationship to undernutrition remain leading causes of global disability-adjusted life years (DALYs). Diarrhea causes 1 to 2.5 billion illness and 1.5 to 2.5 million deaths per year in children under the age of 5 in developing countries. Furthermore, heavy burdens of diarrhea and undernutrition in early childhood profoundly impair growth and development.

Definition

The majority of diarrheal illness are acute in duration (<14 days); however, a subset of illnesses – known as persistent diarrhea – begin acutely then
persist 14 days or longer, thereby resulting in a disproportionate share of diarrhea-related morbidity and mortality. An International Working group who identified several researches priorities for persistent diarrhea has characterized “prolonged” episodes of acute diarrhea (prolonged diarrhea, 7-13 days) in order to understand the pathogenesis and classification of persistent diarrhea, as well as the potential impact of interventions to halt the progression to persistent diarrhea.

**Epidemiology**

Persistent diarrhea is associated with growth faltering, micronutrient deficiencies, impaired neurodevelopment, and increase morbidity and mortality from other childhood diseases. The Indonesian data of Basic Health Research (Riset Kesehatan Dasar, Riskesdas) of Ministry of Health of RI in 2007 revealed that the primary cause of death in babies and under-five children were still diarrhea, respectively 31.4% and 25.2%. These data reveals that currently Indonesia is still battling with this disease.

Indonesia does not have yet the prevalence of persistent diarrhea in population based. However, data from hospital based such as from Child Health Department of Cipto Mangunkusumo Hospital/Faculty of Medicine Universitas Indonesia (RSCM/ FKUI) revealed that the prevalence of persistent diarrhea from January 2009 to December 2010 was 19% (47/253).

**Pathogenesis**

Almost half of the diarrheal deaths in Bangladesh were malnourished children with persistent diarrhea, and the relative risk of dying with persistent diarrhea and severe malnutrition was 17-fold higher than in children with lower degrees of malnutrition. A vicious cycle of infection, malabsorption and malnutrition has been implicated in the perpetuation of diarrheal disease, with reactive oxygen species (ROS) and depleted anti-oxygen defenses believed to play a major role in the pathogenesis of intestinal damage in malnourished children.
Under normal conditions, a delicate balance exists between the production of ROS and the anti-oxidant defenses that protect cells in vivo. Increased generation of ROS can occur as a result of many conditions affecting children including inflammation. Alternatively, ROS can increase in the face of inadequate antioxidant defenses. Selenium-dependent glutathione peroxidase (GPX) is well recognized for its antioxidant, and thus anti-inflammatory effect. Glutathione peroxidase is a major class of selenoprotein in the human body. It is an enzyme that plays a major role in protection against free radicals and oxidative stress. Plasma GPX is correlated with Se status, although there is considerable GPX variability between patients.

Persistent diarrhea due to its syndrome nature, leads to reduce absorption of all nutrients with their subsequent loss in the increased intestinal secretion and stools. This condition could lead to a negative zinc balance. Zinc is also necessary for the integrity and normal functioning of the immune status. The lymphoproliferative and anti-oxidant effects of Zinc are central to this role. The latter enhance the body’s natural protective mechanisms and in combination with increased cell division, they are responsible for tissue repair and wound healing. Zinc deficiency would lead to impairment of the above functions with resultant reduction in growth rates, tissue repair and immunocompetence in children.

Principles of Management of Persistent Diarrhea

In general the management of persistent diarrhea in malnourished children represents a blend of the principles of management of diarrhea and malnutrition. Associated malnutrition may be quite severe in affected children, necessitating rapid nutritional rehabilitation. The following represent the basic principles of management of persistent diarrhea.

a. Rapid resuscitation, antibiotic therapy and stabilization

Acute exacerbations and associated vomiting may require brief periods of intravenous rehydration.
Acute electrolyte imbalance such as hypokalemia and severe acidosis may require correction. Almost 30-50% of malnourished children with persistent diarrhea had systemic infections (bacteremia, pneumonia, and urinary tract infection), and these associated infections are frequently cause early mortality in children with persistent diarrhea. In severely ill children may be best cover with parenteral antibiotics while awaiting the results of culture.

b. Oral rehydration therapy

This is the preferred mode of rehydration and replacement of on-going losses. Hypo-osmolar rehydration fluids as well as cereal based oral rehydration fluids may be advantageous in malnourished children.

c. Enteral feeding and diet selection

Irrespective of the cellular mechanisms and structural alterations in malnourished children with persistent diarrhea, results in altered brush-border and luminal enzymes, with consequent malabsorption. Most children with persistent diarrhea are not lactose intolerant, however, administration of a lactose load exceeding 5g/kg per day is associated with higher purging rates and treatment failure. Alternative strategies for reducing the lactose load in malnourished children with persistent diarrhea include the addition of milk to cereals as well as replacement of milk with fermented products such as yoghurt. Rarely, when dietary intolerance precludes the administration of cow’s milk-based formulations or milk, it may be necessary to administer specialized milk-free diets such as comminuted or blenderized chicken-based diet or an elemental formulation.

d. Micronutrient supplementation

Most malnourished children with persistent diarrhea have associated deficiencies of micronutrient including zinc, selenium, iron and vitamin A. This may be a consequence of poor intake and continued enteral losses,
and requires replenishment during therapy. It is therefore important to ensure that all children with persistent diarrhea and malnutrition receive an initial dose of 100000U of vitamin A and daily intake of at least 3-5mg/kg per-day of elemental zinc. Iron replacement therapy is best initiated only after recovery from diarrhea has started and the diet is well tolerated.\textsuperscript{26,32}

Conclusions

The integrated management approach to children with persistent diarrhea should specifically address the issue of micronutrient supplementation, such as zinc, since the high prevalence of zinc deficiency in children with persistent diarrhea. Improvement of nutritional status in children with persistent diarrhea may lead to improvement of antioxidant status.

References:


