



2nd ICHMS & 2nd LSC

PROCEEDING

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The 2nd International Conference of Medical and Health Sciences (ICMHS) and The 2nd Life Sciences Conference (LSC) 2016

*"Towards a Better Quality of Life
through Interdisciplinary Research"*

Yogyakarta, 9th-10th December 2016
The Alana Hotel and Convention Center

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**The 2nd International Conference of Medical & Health Sciences
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**Chair person of The 2nd International Conference of Medical and
Health Sciences and The 2nd Life Sciences Conference 2016**



Welcome to Jogja, sugeng rawuh!

For the second time, the Faculty of Medicine and Health Sciences Universitas Muhammadiyah Yogyakarta is going to conduct the 2nd International Conference of Medical and Health Sciences (ICMHS) this December in vibrant Yogyakarta, Indonesia. This year we are going to collaborate with the Life Sciences Society of Pakistan for their 2nd Life Sciences Conference (LSC) with Dr. Zahid Iqbal as the general secretary.

This year's conference theme "Towards a better quality of life through interdisciplinary research" will be celebrating an era of seamless interdisciplinary integration and collaboration in scientific innovations with the involvement of more extensive topics and disciplines in the conference. We aim to exhibit the products of that kind of approach in solving challenges, improving the quality of life, and creating sustainable developments. We are happy to announce that our conference is filled with Invited speakers from Pakistan, United States of America, Uni Emirates Arab, Malaysia and Indonesia. Presentations will be conducted in oral as well as poster that covers topics from medicine, public health, dentistry, pharmacy, biomedical to agriculture. To put more credibility to the conference we are collaborating with Isra Medical Journal and the Asian Journal of Agriculture and Biology to publish selected papers from the event. Other paper will be published in the ISBN Proceeding book.

The last but not least, enjoy the conference, start networking and sharing ideas, and let immerse yourself to the heritage cultural ambient of Jogja, sumonggo!

Yogyakarta, 1st December 2016

dr. Iman Permana, M.Kes, Ph.D.

**The 2nd International Conference of Medical & Health Sciences
and
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**Dean of Faculty of Medicine and Health Sciences,
Universitas Muhammadiyah Yogyakarta**



Assalamu'alaikum Wr. Wb.

Science, especially in the areas of health and life growing more rapidly. We need to work together in the research of various disciplines to the advancement of science and to provide benefits to human life.

After successfully organized international scientific meeting last year, the Faculty of Medical and Health Sciences Universitas Muhammadiyah Yogyakarta, held the second scientific meeting ICMHS along with "2nd Life Sciences Conference". In this second scientific meeting, FKIK UMY collaborates with various researchers, among others from Pakistan, Malaysia, and the United States. Taking the theme "Towards a better quality of life through interdisciplinary research" we hope to establish cooperation with various parties to be able to contribute ideas to the civilization of human life.

Finally, we congratulate the scientific meeting in the city of Yogyakarta Indonesia. Enjoy the beautiful city of Yogyakarta with priceless historical relics. We hope that this meeting can run smoothly and provide benefits to the advancement of knowledge.

Wassalamu'alaikum Wr. Wb.

Yogyakarta, 1st December 2016

dr. Ardi Pramono, M.Kes, Sp.An.

**The 2nd International Conference of Medical & Health Sciences
and
The 2nd Life Sciences Conference 2016**

Rector of Universitas Muhammadiyah Yogyakarta



Assalaamu'alaikum Wr. Wb.

Ladies and Gentlemen,

Welcome to the 2nd International Conference on Medical and Health Science in conjunction with the 2nd Life Sciences Conference 2016

Welcome to Yogyakarta City of Tolerance

Our Faculty of Medicine and Health Sciences has been doing such international conference almost every year for the last ten years. This and other previous conferences are the things that supporting our vision as an excellence and Islamic university, a young and global university. We will always try to keep monitoring the development of science through sending more lecturers to do the sabbatical leave overseas, doing international research collaborations and also the international conference. Each department should do this strategy of internationalization so that each department has its own network. Faculty of medicine and health science is one of the most progressive units in implementing this strategy by inviting international experts on a regular basis. This program will certainly strengthen our vision.

International conference on medicine and health sciences is a smart choice to offer our lecturers access to the most recent development of the subjects. The participants will also gain the same knowledge and latest information on medicine and health sciences. As everyone knows that the development of science and technology are faster today compared to the previous period. Information technology, computer, and other development havefastened the transformation of medicine and health science into the different and more complex stage.

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Cellular technology, for instance, can be used for several functions including those that directly impacts our daily life. There is no long distance call anymore today because cellular phone can do everything we need to contact other people far from where we stand anytime anywhere. People will finally innovate cellular phone for the sake of personal health services. We will in the future using our simple cellular phone to detect our body temperature, blood pressure, even how much fat we have in our body and how much it is supposed to be. We may also be able to check the health of our body without leaving our house and order medicine without going into the drug store. Everything is almost possible as long as we think hard for the better of people in the future. Enjoy the conference and don't forget to visit our rich tourist destinations, mountains, beaches or caves (underground waterways).

Thank you

Wassalaamu'alaikum Wr. Wb.

Prof. Dr. Bambang Cipto, MA

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Keynote Speech

**by Head of Provincial Health Office Special Region of Yogyakarta
in International Conference
of Medical and Health Sciences and Life Sciences Conference**

The Alana Hotel and Convention Center, Yogyakarta, December 9-10, 2016

The honorable:

- Rector of Muhammadiyah University of Yogyakarta,
- The Dean of Medical and Health Sciences Muhammadiyah University of Yogyakarta,
- The chairman of organizing committee of the international conference of medical and health,
- Distinguished guests and colleagues.

Assalamu'alaikum Warahmatullahi Wabarakatuh,

First of all, we thank God for His blessings that today we may attend the International Conference of Medical Health Towards a Better Quality of Life Through Interdisciplinary Research in Yogyakarta.

My distinguished colleagues,

In Indonesia National Long Term Development Plan (2005-2024), the Indonesian Ministry of Health have determined a paradigm shift that have governed health services in health development plan. There has been a shift from Curative Health Services to Preventive and Promotive Health Services.

Recently, Indonesia suffers from a triple burden of diseases as health development challenges. The triple burden of diseases are: 1) the backlog of common infections, undernutrition, and maternal mortality; 2) the emerging challenges of non-communicable diseases (NCDs), such as cancer, diabetes, heart disease; and 3) mental illness, and the problems directly related to globalization, like pandemics and the health consequences of climate change.

Dear colleagues,

Here are some data that show several health problems in Indonesia:

1. Maternal mortality rate in 2015 is 4,809 cases, infant mortality rate in 2015 is 22,267 cases;
2. Regarding to children under the age of five, the national stunting rate is 37.2% which consists of 18% for very short dan 19.2% for short (Riskesdas 2013);

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3. HIV testing coverage is 14% dan antiretroviral (ARV) therapy coverage is 65.58% (Directorate General of Disease Control and Prevention Ministry of Health, 2015);
4. Tuberculosis (TB) notification rate in 2015 is 73.5% and tuberculosis treatment success rate is 72% (Directorate General of Disease Control and Prevention Ministry of Health, 2015).

Distinguished guests,

Indonesia Health Development Program in 2015-2019 strengths in improving human quality life through Health Indonesia Program with family approach. The Indonesian Ministry of Health issued The Minister of Health Regulation (Permenkes) No. 39 Year 2016 as a Guideline of Implementation of Health Indonesia Program with Family Approach. This program has 12 main indicators as markers of a family health status. Currently, many health programs have been implemented by Indonesian Ministry of Health, Provincial Health Offices, and District Health Offices. However, many health problems, some as mentioned above, still become health burdens. We may ask a question whether the programs that we conducted have answered the health problems we have in Indonesia.

It would be better if all health programs that we implement based on scientific health research, especially interdisciplinary research. The research should be related to detection, prevention, and treatment of diseases or problem solving for better health.

My dear colleagues,

Being a province with speciality, Special Region of Yogyakarta placed Traditional Medicine as one of the priority programs in Provincial Medium Term Development Plan (2017-2022). We still encounter many challenges in developing Traditional Medicine, especially in providing services which are based on scientific evidence.

Distinguished colleagues,

We look forward to results of interdisciplinary research which would support health problem solving, especially by developing traditional medicine in Yogyakarta. We believe that collaboration in interdisciplinary research would improve quality of human life.

Finally,

Thank you for your attention. We wish you a successful conference.

Wassalamu'alaikum Warahmatullahi Wabarakatuh,

On behalf of
the Head of Provincial Health Office
Special Region of Yogyakarta

Drg. Pembajun Setyaningastutie, M.Kes

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**SPEAKER OF
INTERNATIONAL CONFERENCE**

Zahid Iqbal

Al-Nafees Medical College Isra University Islamabad Campus Islamabad, Pakistan
"One Health Program for Public Health Benefit"

Prof. Dr. Abdul Khaliq

Professor, Department of Agronomy, University of Agriculture, Faisalabad
"Role of Agriculture in Poverty Alleviation of Rural Areas"

Fitri Arofati

Universitas Muhammadiyah Yogyakarta, Indonesia
"Continuing Professional Development of Practicing Nurses in Indonesia"

Tri Wahyuliati

Universitas Muhammadiyah Yogyakarta, Indonesia
"Diabetic Neuropathy - A Chance Towards A Better Treatment"

Mohammad Khalid Ashfaq

University of Mississippi, USA
"Natural Products –Use or Misuse"

Muhammad Mukhtar

American University of Ras Al Khaimah, United Arab Emirates
"Emerging Biotechnologies and Genomic Medicines in Human Health and Well-Being"

Muhammad Sasmito Djati

Brawijaya University Malang, Indonesia
"Herbal Medicine a Holistic Approach: in case of food supplement formulation of Sauropusandrogynus and Elephantopuscaberto modulate immune and hormonal system in pregnant Salmonella typhi infected mice"

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REVIEWER

1. Dr. Zahid Iqbal, Ph.D (Isra University, Islamabad, Pakistan)
2. Prof. Dr. Abdul Khaliq (University of Agriculture, Faisalabad)
3. Dr. Mohammad Khalid Ashfaq, DVM, DTVM, MS, Ph.D (University of Mississippi, USA)
4. Dr. Muhammad Mukhtar, Ph.D (American University of Ras Al Khaimah, United Arab Emirates)
5. Dr. Ir. Muhammad Sasmito Djati, MS. (Brawijaya University Malang, Indonesia)
6. Fitri Arofiati, S.Kep., Ns., MAN., Ph.D (Universitas Muhammadiyah Yogyakarta, Indonesia)
7. Dr. SN Nurul Makiyah, S.Si., M.Kes (Universitas Muhammadiyah Yogyakarta, Indonesia)
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20. Drh. Tri Wulandari K, M.Kes (Universitas Muhammadiyah Yogyakarta, Indonesia)
21. Dr. dr. Wiwik Kusumawati, M.Kes (Universitas Muhammadiyah Yogyakarta, Indonesia)
22. Sabtanti Harimurti, S.Si., M.Sc., Ph.D., Apt. (Universitas Muhammadiyah Yogyakarta, Indonesia)

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**SPEAKER OF
INTERNATIONAL CONFERENCE**

Diabetic Neuropathy - A Chance Towards A Better Treatment

Tri Wahyuliati

Medical Faculty of Universitas Muhammadiyah Yogyakarta, Indonesia
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Abstract

Diabetic neuropathy is the most important and commonest diabetic complication, afflicting over 50% of all diabetics. Center of Indonesia's data and information informed, during 2011, diabetic neuropathy affects >50% of diabetic patients with amputation numbers ranging from 15-30%. These problems led to a high number of disabilities, declining productivity and huge costs.

Multiple pathogenic of hyperglycemia contribute to diabetic complications. Additional experiments indicate that diabetic neuropathy is not simply the result of nerve cells being damaged directly by hyperglycemia. The clinical manifestations, underlying pathology and aetiology are varied and complex. There remains much debate and controversy to prove effective treatments for diabetic neuropathy.

To uncover these problems, we did some studies in 2007-2015 with the objective to determine a good approach to treat diabetic neuropathy. Since the research about "Correlation among the duration of suffering DM and diabetic neuropathy degree", "Comparison of diabetic neuropathy degree based on the state of diabetes", "Management of ulcus diabeticum - a study of antibiotics and diet counseling effectivity", "Efficacy of diabetic foot exercise in the diabetic neuropathy based on the diabetic neuropathy scale and the diabetic neuropathy examination", "Susceptibility pattern and antibiotic therapeutic effectivity", "Pattern development of diabetic foot", "Pattern of serum levels changes of nerve growth factor, brain derived neurotrophic factor and neurotrophin-3 after performing diabetic foot exercise", and "Diabetic foot exercise induced serum neurotrophin-3 in diabetic neuropathy".

Those studies and some other data shown a peripheral effect of intervention can be a good chance for diabetic neuropathy therapeutic strategies in the future.

Keywords : Diabetes ; Neuropathy ; Diabetic Neuropathy ; Pathogenesis ; Treatment

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INTRODUCTION

Diabetic people suffer much morbidity and premature mortality because of chronic diabetic complications, which include cardiovascular and cerebrovascular disease, retinopathy, and neuropathy¹. Diabetic neuropathy is the most common and important diabetic complication, afflicting over 50% of all diabetics, and is the leading cause of nontraumatic limb amputations with a high number of disabilities, declining productivity and huge costs¹. Indonesia's data and information centers of the Basic Health Research also informed, during 2011, diabetic neuropathy affects more than 50% of diabetic patients with amputation numbers ranging from 15-30%^{2,3}.

Diabetic neuropathies are a heterogeneous group of disorders with different mechanisms. They can be proximal or distal, focal or diffuse, causing pathological changes with great impact on the quality of life of the patients. Multiple pathogenic effectors downstream of hyperglycemia contribute to chronic diabetic complications. The findings indicate that the incidence of diabetes neuropathy increases with the duration and severity of disease, and that strict glycemic control can delay its development and progression. Hyperglycemia is known to underlie most, but not all, diabetic complications. The clinical manifestations, underlying pathology, and aetiology of human diabetic neuropathy are varied and complex. There remains much debate and controversy on the pathophysiology of the condition. Some of the interventions clinical trials have failed to prove effective. To date we have no evidence-based and effective treatment(s) for human diabetic neuropathy^{4,5}.

Symptomatic therapy has become available, and better and newer treatment modalities based on etiologic factors are being explored with significant impact on morbidity and mortality. A number of mechanical measures for the treatment of diabetes neuropathy have been examined, but it is unclear whether these have salutary effects over and above those of placebo. In addition, there is the suggestion that surgical unentrapment of nerves might make symptoms relieved, but this form of intervention has not yet been endorsed universally. A number of research have been done, but it is unclear whether these treatments are the most effectively. Some treatment approaches can augment current studies and lead to new discoveries to identify more effective therapeutic methodes^{6,7,8,9}.

To uncover these problems, we did some studies in 2007 – 2015 with the objective to determine a good approach to treat diabetic neuropathy. Since the research about "Corelation among the duration of suffering DM and diabetic neuropathy degree" (2007), "Comparation of diabetic neuropathy degree based on the state of diabetes" (2008), "Management of ulcus diabeticum - a study of antibiotics and diet counseling effectivity" (2010), "Efficacy of diabetic foot exercise in the diabetic neuropathy based on the diabetic neuropathy scale and the diabetic neuropathy examination"

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(2013), "Susceptibility pattern and antibiotic therapeutic effectivity" (2014), "Pattern development of diabetic foot" (2015), "Pattern of serum levels changes of nerve growth factor, brain derived neurotrophic factor and neurotrophin-3 after performing diabetic foot exercise" (2015), and "Diabetic foot exercise induced serum neurotrophin-3 in diabetic neuropathy" (2015).

RESEARCH'S DATA

Study-1. We did a research in title "Corelation among the duration of suffering DM and diabetic neuropathy degree" (Aulia M & Wahyuliati T, 2007). We investigated 36 subjects by cross sectional design. The result shown a significant association between long suffering from diabetes with diabetic neuropathy rates. The longer suffer from diabetes, the more severe degree of neuropathy occurred anyway.

Study-2. We investigated 64 subject in research "Comparison of diabetic neuropathy degree based on the state of diabetes" (Susanti R. & Wahyuliati T., 2008). We pooled the subject in poorly, moderate, and well controlled of Diabetes mellitus. The study found, the diabetic patients with moderate and poorly controlled of diabetes mellitus more suffer from diabetic neuropathy significantly compared to well-controlled of diabetes mellitus.

Study-3. We did a prospective cohort study, pre test – post test group design in "Management of ulcus diabeticum - a study of antibiotics and diet counseling effectivity" (Wahyuliati, Inayati H, Dewi A, 2010). We investigated 38 subjects with no significant differences in terms of age, random blood glucose, duration of DM, recurrence rate and duration of ulcer, score of DNS, DNE and wagner.

Clindamycin, cefadroxil, ceftriaxon, amoxicillin, ciprofloxacin and cefotaxime which been used in the study were not influenced significantly effective for the treatment ($p > 0.05$). Only three antibiotics has $RR > 2$, it can be considered effective clinically. That were clindamycin ($RR=2.571$), ciprofloxacin ($RR=2.880$), cefotaxim ($RR=2.306$).

Diet counseling had a significant result to control random blood glucose ($RR=-2,139$; $p,0,032$) and also to reduce the number of ulcus recurrent ($RR=-2,157$, $p,0,047$).

The study concluded Clindamycin, Ciprofloxacin and Cefotaxim could be considered clinically effective. Diet counseling has a significant result to control random blood glucose and reduce the number of ulcus recurrent.

Study-4. We investigated 26 subjects in research "Efficacy of diabetic foot exercise in the diabetic neuropathy based on the diabetic neuropathy scale (DNS) and the diabetic neuropathy examination (DNE)" (Arif D, Ciputra T, Wahyuliati T., 2013) with a quasi experimental control group design. Twenty six subjects were divided into two groups, 13 subjects in the intervention group and 13 subjects in the control group. The result of statistical calculation by DNS was $p=0,002$ ($<0,05$) at intervention

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group and control group was $p=0,212 (>0,05)$ and $NNT = 2$. The results of the statistics calculation for intervention group by DNE was $p=0,004 (<0,05)$ and for control group $p=0,636(>0,05)$. The number needed to treat (NNT) is 2. The study concluded, diabetic foot exercise was able to reduce the degree of diabetic neuropathy were significantly both by diabetic neuropathy scale and the diabetic neuropathy examination.

Study-5. We did a prospective cohort , *pre test – post test random control group* design in “Susceptibility pattern and antibiotic therapeutic effectivity” (2014). There were 38 subjects, 26% men and 74% women. No significant differences in terms of age, initial GDS, the DM duration , the ulcers duration, ulcer recurrence rate and baseline score of DNS, DNE and wagner. The proportion of antibiotics which were prescribed including Clindamycin, Cefadroxil, Ceftriaxon, Amoxicillin Ciprofloxacin and cefotaxime (see table 1-4) :

Table 1. List of Antibiotic

Antibiotic	n	%
Clindamycin	5	13.2
Cefadroxil	2	5.3
Ceftriaxon	11	28.9
Amoxicillin	7	18.4
Ciprofloxacin	9	23.7
Cefotaxime	4	10.5
Total	38	100

Tabel 2. The effectiveness of antibiotics based on DNS Score

Antibiotic	DNS		
	RR	95% CI	p
Clindamycin	1,432	-0,8475 – 4,0475	0,245
Cefadroxil	0,511	-4,0475 – 0,8475	0,315
Ceftriaxon	0,028	-1,9960 – 1,11596	0,871
Amoxicillin	0,450	-2,1700 – 1,2557	0,294
Cyprofoxacin	1,800	-1,0094 – 2,2539	0,514
Cefotaxim	0,280	-1,8124 – 2,1124	0,871

Tabel 3. The effectiveness of antibiotics based on DNE score

Antibiotik	DNE		
	RR	95% CI	P
Clindamycin	2,571	-1,0901 – 2,6901	0,210
Cefadroxil	0,961	-2,6901 – 1,0901	0,311
Ceftriaxon	1,800	-1,9275 – 1,8275	0,264
Amoxicillin	1,200	-1,8371 – 2,0970	0,881
Cyprofoxacin	1,808	-1,5045 – 2,3215	1,000
Cefotaxim	2,306	-2,3154 – 2,9564	0,502

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Table 4. The effectiveness of antibiotics based on Wagner score

Antibiotic	Wagner		
	RR	95% CI	P
Clindamycin	2,291	-1,6200 – 3,0200	0,141
Cefadroxil	1,025	-1,0200 – 1,6200	0,210
Ceftriaxon	0,720	-0,6873 – 1,0146	0,410
Amoxicillin	0,720	-0,5524 – 1,2953	0,410
Cyprofloxacin	2,880	-0,1911 – 3,5689	0,099
Cefotaxim	0,720	-1,0084 – 1,1084	0,410

Tables above shown, antibiotics therapy were not influenced significantly the effectiveness of treatment according to the DNS, DNE and Wagner ($p > 0,05$). The relative risk of each antibiotic therapy were computed and results showed: Clindamycin (RR = 2.571) and Cefotaxim (RR = 2.306) based on DNE scores; Clindamycin (RR = 2.291) and Ciprofloxacin (RR = 2.880) based on Wagner. The RR > 2 can be considered as clinically effective. Cyprofloxacin is the most sensitive antibiotics, followed by Clindamycin and Cefadroxyl as much as 60.5% and 57.8% respectively. Six antibiotics did not significantly effective for diabetic ulcers therapy based on DNS, DNE and Wagner. Clindamycin, Ciprofloxacin and Cefotaxim might be considered clinically effective.

Study-6. We did a prospective cohort study on “Pattern development of diabetic foot based on the DNS, DNE and Wagner Classification (Wahyuliati T & Inayati H, 2015). Has been studied 38 subjects, there are 26% men and 74% women. No significant differences in terms of age, initial GDS, the DM duration, the ulcers duration, ulcer recurrence rate and baseline score of DNS, DNE and wagner classification.

The study found a significant correlation between neuropathy variable (DNS and DNE) and angiopathy variable (wagner) with $p < 0,05$. The higher score of DNS correlated with the higher wagner classification ($p 0,042$), and the higher score of DNE correlated with the higher wagner classification ($p 0,037$).

The study concluded a significant correlation between neuropathy and angiopathy variable. The higher score of DNS correlated with the higher wagner classification, and the higher score of DNE correlated with the higher wagner.

Study-7. We did a true experimental study with randomaized pre test – post test control group design on “Pattern of serum levels changes of nerve growth factor, brain derived neurotrophic factor and neurotrophin-3 after performing diabetic foot exercise” (Wahyuliati T, Pranoto A, Wibowo S., 2015). A total of 36 subjects meeting the inclusion and exclusion criteria were included in the exercise group or the control one with age matched systematic random sampling method.

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The study found, exercise group had a significant improvement on the score of ABI ($p.0.002$), systolic blood pressure ($p.0.014$), diastolic blood pressure ($p.0.055$), DNS ($p.0.01$), DNE ($p.0.001$). Increase of serum level of NGF ($p.0.157$), decrease of serum level of BDNF ($p.0.059$), and increase of serum level of NT-3 ($p.0.049$).

Control group has a result respectively on ABI ($p.0.131$), systolic blood pressure ($p.0.668$), diastolic blood pressure ($p.0.216$), DNS ($p.1.00$), DNE ($p.0.543$), increase of NGF ($p.0.402$), decrease of BDNF ($p.0.803$), and increase of NT-3 ($p.0.264$).

The comparison results of the two groups have significant different on the score of ABI ($p.0.01$), systolic blood pressure ($p.0.01$), diastolic blood pressure ($p.0.01$), DNS ($p.0.01$), DNE ($p.0.01$), increase of NGF ($p.0.04$), decrease of BDNF ($p.0.01$), and increase of NT-3 ($p.0.01$).

The study concluded diabetic foot exercise has a peripheral affect on a clinically significant improvement based on ABI scores, systolic and diastolic blood pressure, DNS and DNE. A significant increase in serum levels of NGF, a significant decrease in BDNF serum levels is as reductive compensation from the influence of peripheral foot exercise work. The most affected Neurotrophin level is NT-3 which is more increased being compared to NGF and BDNF.

Study-8. We did a true experimental study with randomaized pre – post test control trial on “Diabetic foot exercise induced serum neurotrophin-3 in diabetic neuropathy” (2015). A total of 36 subjects meeting the inclusion and exclusion criteria were included in the exercise group or the control one with age matched systematic random sampling method.

The result found, exercise group had a significant improvement on the score of ABI ($p.0.002$), systolic blood pressure ($p.0.014$), diastolic blood pressure ($p.0.055$), DNS ($p.0.01$), DNE ($p.0.001$) and increased of serum level of NT-3 ($p.0.049$).

Control group had result respectively on ABI ($p.0.131$), systolic blood pressure ($p.0.668$), diastolic blood pressure ($p.0.216$), DNS ($p.1.00$), DNE ($p.0.543$), and increase of NT-3 ($p.0.264$).

The comparison results of the two groups had a significant different on the score of ABI ($p.0.01$), systolic blood pressure ($p.0.01$), diastolic blood pressure ($p.0.01$), DNS ($p.0.01$), DNE ($p.0.01$), and increased of NT-3 ($p.0.01$).

The study concluded, diabetic foot exercise had a peripheral affect on a clinically significant improvement based on ABI scores, systolic and diastolic blood pressure, DNS and DNE, and increase of serum level of NT-3

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CONCLUSION

Thus, it can be concluded that in patients with diabetic neuropathy, a peripheral effect on the treatment like diabetic foot exercise has a clinically significant improvement based on ABI scores, systolic and diastolic blood pressure, DNS and DNE. A significant increase in serum levels of NGF, a significant decrease in BDNF serum levels are as reductive compensation from the influence of peripheral exercise foot work. The most affected Neurotrophin level is NT-3 which is more increased being compared to NGF and BDNF.

Therapeutic strategies in the future might consider a peripheral factors to improve diabetic neuropathy, when a systemic approach shown an unsatisfied result. Diabetic foot exercise and other local or peripheral intervention like intra-muscular injection for synthetic NT-3 and ointment can be a chance towards a better treatment.

SUGGESTION

Accordingly, the study suggests (1) clinicians to include appropriate physical exercise suitable for the patients' condition. Low impact workout such as diabetic foot exercise can still be applied, especially in patients with severe conditions. (2) nurses, gymnastics groups, health counselors, and various stakeholders in health care systems to always manage to implement physical exercise including diabetic foot gymnastics in any effort to improve health status. (3) patients and societies to perform actively even the low impact exercise like diabetic foot gymnastics as proven to provide benefits. (4) therapeutic strategies in the future to consider neurotrophic factors particularly NT-3 level given as the least affected by diabetic foot exercise, for instance, an intra-muscular injection for synthetic NT-3 or an ointment.

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