DEPARTMENT OF INTERNAL MEDICINE AND REHABILITATION SCIENCE
TOHOKU UNIVERSITY GRADUATE SCHOOL OF MEDICINE

May 15, 2023

Dear Professor Petr Dobsak,

It is pleasure and honor for me to assess habilitation thesis of Ms. Ladislav Batalik for the appointment of Associate Professor.

Cardiovascular diseases are the leading cause of morbidity and mortality worldwide. Increased rates of morbidity and mortality have led to the increased need for the implementation of secondary prevention interventions. Exercise-based cardiac rehabilitation (CR) represents a multifactorial intervention, including elements of physical exercise and activity, education regarding healthy lifestyle habits (smoking cessation, nutritional habits), to improve the physical capacity and psychological status of cardiac patients. However, participation rates in CR programs remain low due to socioeconomic, geographical and personal barriers. Recently the COVID-19 pandemic restrictions have added another barrier to CR programs.

Cardiac telerehabilitation (CTR), integrating advanced technology for both monitoring and communicating with the cardiac population, appears to be an innovative CR alternative that can overcome some of the barriers preventing CR participation.

Ms. Batalik presented 9 papers (Study1～Study9) and demonstrated the importance of CRT in cardiovascular diseases and cancer.

In Study 1, Ms. Batalik presented a review of CTR. TR could (compared to traditional center-based program of cardiac rehabilitation) represent usable, effective, and safe alternative forms of CR. This supports the effectiveness of TR, which could positively influence barriers to participation in cardiac rehabilitation programs. In Study 2, Ms. Batalik introduced rationale and design of RCT protocol of CR based on the use of CTR in the Czech Republic (CR-GPS). Ms. Batalik presented the benefits and effectiveness of using a wrist heart rate monitor as a telerehabilitation device in cardiac patients (Study 3), and 12 weeks effects (Study 4) and long-term exercise effects (Study 5) after CTR in patients with coronary artery disease. It has been demonstrated that CTR induces satisfactory long-term effects in pVO2, exercise performance, and perceived general health in CAD patients with low to moderate cardiovascular risk. Moreover, in Study 6, Ms. Batalik showed that CTR Based on the walking test improved cardiorespiratory

Address: 1-1 Seiryo-machi, Aoba-ku, Sendai, Miyagi, 980-8575, Japan
Tel. +81-22-717-7353 Fax. +81-22-717-7355

fitness in people diagnosed with coronary heart disease during the COVID-19 Pandemic. In Study 7, Ms. Batalik indicated that CTR appears to be a useful, efficient, safe, and cost-effective alternative type of CR for individuals with heart disease compared to standard CBCR programs.

Exercise interventions are increasingly being recognized as an important part of treatment and supportive care for cancer survivors. Furthermore, in Study8, Ms. Batalik published the first review article (Study 8) to focus on alternative approaches to rehabilitation after primary treatment of cancer. The systematic review results in the six studies showed a significant cardiorespiratory fitness improvement after home-based exercise intervention compared with the control group. Ms. Batalik shows that exercise for cancer survivors could be prescribed as aerobic exercise two to five times a week, 20 to 50 min per section at 11 to 14 RPE. The dose of exercise time, frequency of exercise per week, and exercise intensity should be gradually increased optimally after consultation with an exercise specialist.

Lastly, in Study 9, Ms. Batalik suggested that telehealth interventions are feasible and induce physiological and psychological benefits for cancer patients and survivors. There is an assumption that telehealth interventions and exercise may be an effective future alternative approach in supportive cancer care.

All the papers are very well written. In every paper, Ms. Batalik carefully and thoroughly collected references, properly planned and carried out studies and accurately and appropriately analyzed the results and has properly drawn discussion and conclusions.

Opponent's questions (Prof. Masahiro Kohzuki):

1. Is there a medical fee for remote cardiac rehabilitation in the Czech Republic? If it's not, can it spread? If so, is it sufficiently profitable?

2. What equipment is needed for remote cardiac rehabilitation? Who will pay for the equipment (for example, wristwatch)?

3. How long should remote cardiac rehabilitation be performed? Is it profitable?

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4. During remote cardiac rehabilitation, is it possible to build an automatic monitoring system instead of human monitoring due to the spread of AI? In that case, is there any possibility that the medical staff involved in cardiac rehabilitation will be unnecessary?

Collectively, I judge that Ms. Batalik has the ability to become an Associate Professor. I hereby confirm that the presented habilitation thesis meets the standard requirements set for the level of habilitation theses in the field of Kinanthropology and I recommend it for defense".

Yours Sincerely

D.,
Professor Emeritus
Tohoku University Graduate School of Medicine
(Chairman and President
Yamagata Prefectural University of Health Sciences)
1-1, Seiryo-cho, Aoba-ku,
Sendai, 980-8574,Japan