

# Computerized cognitive training and whole-body cryotherapy and health-related psychological factors in seniors

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		<input type="checkbox"/> Protocol
<b>Registration date</b> 06/09/2022	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
<b>Last Edited</b> 06/09/2022	<b>Condition category</b> Mental and Behavioural Disorders	<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Computerized cognitive training (CCT) and whole-body cryotherapy (WBC) are non-drug interventions aimed at improving cognitive performance and also non-specific psychological factors which may have an impact on healthy behaviours. The aim of this study is to evaluate the effect of CCT and WBC on health-related psychological factors in seniors.

### Who can participate?

Community-dwelling seniors aged 65 and over with normal or mildly impaired cognition recruited from community centers supporting education (i.e., library, computer labs, discussion clubs)

### What does the study involve?

Participants are allocated to CCT, CCT and WBC, or to standard stimulation.

Computerized cognitive training (CCT) includes nine sessions, each lasting 90 minutes. Each session is supervised by a certified trainer in accordance with the instructions. Attendance is checked for each session. Each session is supervised and monitored by an independent researcher to ensure that the course of the session is in accordance with the protocol. Each session is attended by small groups of 10 to 15 people. The program utilized for CCT is Mind Academy® from Formsoft® (Wroclaw, Poland), educational software created to improve the mental capacity of the elderly. The training program is created under the guidance of psychologists and recommended by lecturers of psychology at SWPS in Wroclaw as well as by clinical psychologist practitioners. It has been disseminated among institutions that used psychoeducational programs, for individual recipients and care homes for elderly people. The level of the cognitive exercises is adapted to the current level of participants' cognitive function and includes cognitive functions tasks such as immediate and delayed memory, attention, processing speed, reaction time, visuospatial skills, and flexibility.

Participants in the CCT and WBC group undergo 10 WBC sessions in 2 weeks (Monday-Friday, excluding weekends). Sessions consist of short exposures (2-3 minutes) to extremely low temperatures (-110°C to -130°C). A liquid nitrogen-cooled cryotherapy chamber is used. The intervention is under the supervision and care of professional staff, and each participant is

examined by a physician who measures their blood pressure before each WBC session. Five to six participants undergo WBC at the same time, and they are required to wear minimal clothing.

What are the possible benefits and risks of participating?

CCT is a method of improving cognitive performance which may have a non-specific effect on psychological variables (cognitive, emotional and behavioral aspects), leading to changes in strategies of coping with cognitive deficits. The results of the study may enable the introduction of the interventions into treatment.

The interventions could improve the psychological disposition of the participants, i.e. optimism-pessimism, life satisfaction, self-esteem, mood and quality of life, as well as cognitive performance. No adverse health effects are expected.

Where is the study run from?

Wroclaw Medical University (Poland)

When is the study starting and how long is it expected to run for?

December 2017 to May 2019

Who is funding the study?

Investigator initiated and funded

Who is the main contact?

Dr Renata Wallner

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## Contact information

### Type(s)

Scientific

### Contact name

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

**ClinicalTrials.gov (NCT)**

Nil known

**Protocol serial number**

Trial ID: 1

## Study information

### Scientific Title

Synergetic effects of computerized cognitive training and whole-body cryotherapy – a controlled pre-post study

### Acronym

CCTWBTPF

### Study objectives

In the group of senior volunteers participating in computerized cognitive training (CCT), the researchers want to assess the psychological variables that have a potential impact on their pro-health behavior, and also observe whether the addition of whole-body cryotherapy (WBC) to computerized cognitive training (CCT) will affect these variables.

### Ethics approval required

Old ethics approval format

### Ethics approval(s)

Approved 29/12/2017, Bioethical Commission of the Wroclaw Medical University (50-367 Wrocław, ul. Pasteura 1, Poland; +48 (0)71 784 10 14, +48 (0)48 71 784 17 10; bioetyka@umed.wroc.pl), ref: KB-780/2017

### Study design

Prospective pre/post controlled single-blind parallel-group study

### Primary study design

Observational

### Study type(s)

Prevention

### Health condition(s) or problem(s) studied

Prevention of dementia in older adults (aged 65+ years)

### Interventions

A prospective, pre/post controlled, single-blind trial, parallel-group study is conducted. The study is not randomized due to the fact that the participants voluntarily agree to participate in one of the two groups or the control group (active group) with standard stimulation. Participants are assigned to groups taking into account their decision, physical condition, and possible medical contraindications to WBC, i.e., with CCT (n = 32). Participants who don't meet the standard contraindications to WBC and are willing to participate in it are assigned to the CCT and WBC group (n = 33), and other people are enrolled into the control group (CG, n = 25).

Computerized cognitive training (CCT) (Mind Academy® from Formsoft®, Wrocław, Poland) program is an educational software created to improve the mental capacity of the elderly. The training program was created under the guidance of psychologists and recommended by lecturers of psychology at SWPS in Wrocław and clinical psychologist practitioners. It is disseminated in institutions that use psychoeducational programs, for individual recipients and care homes for elderly people.

The level of the cognitive exercises is adapted to the current level of participants' cognitive function and include tasks of cognitive functions as immediate and delayed memory, attention, processing speed, reaction time, visuospatial skills, and flexibility. The sessions are conducted according to a specific schedule and include the following modules:

1. Discussion of homework, carried out together in a group
2. Theoretical part in the form of transferring knowledge about the functioning of the brain, specific cognitive functions and learning strategies
3. Own work with a computer using tasks that stimulate cognitive functions  
discussion of group tasks and common tasks performed in small groups or in the whole group tasks (stimulating cognitive and interpersonal functions)
4. Discussion of planned homework
5. Summary of the training session

Additionally, the participants did home assignments (twice a week, 90 minutes each) to motivate them to independent precognitive activity and enhance transferring of the acquired skills from training to everyday life.

The cognitive training includes nine sessions, each lasting 90 minutes. Each session is supervised by a certified trainer in accordance with the instructions. Attendance is checked at each session. Each session is supervised and monitored by an independent researcher to ensure that the course of the session is in accordance with the protocol. Each session is attended by small groups of 10 to 15 people and takes place in the Lower Silesian Public Library in Wrocław. CCT is a cognitive method of improving cognitive performance which may have a non-specific effect on psychological variables that create specific attitudes (cognitive, emotional and behavioral aspects), leading to changes in strategies of coping with cognitive deficits.

#### Whole-Body Cryotherapy (WBC)

The participants undergo 10 WBC sessions in 2 weeks (Monday-Friday, without the weekends); the sessions consisted of short, cyclic exposures (2-3 minutes) to extremely low temperatures (-110°C to -130°C). A liquid nitrogen-cooled cryotherapy chamber (CR 2002) is used. The intervention is under the supervision and care of professional staff, and each participant is examined by a physician who measures their blood pressure before each WBC session. Each WBC takes place in the medical company Creator Sp. z o.o. in Wrocław. Five to six participants would undergo WBC at the same time, and they are required to wear minimal clothing (shorts and a t-shirt), gloves, a headband (or a beanie) as well as a mask covering the mouth and nose, knee-high socks and dry shoes (e.g. wooden).

#### Intervention Type

Mixed

#### Primary outcome(s)

1. Level of dispositional optimism, defined as generalized expectations of positive events measured using the Revised Life Orientation Test (LOT-R) at T1: before intervention (CCT) or (CCT+WBC), T2: 9 weeks (immediately after intervention)
2. Level of sense of self-efficacy, defined as successful coping, adaptation to stressful events in

life measured using the General Self-Efficacy Scale – Schwarzer (GSES) at T1: before intervention (CCT) or (CCT+WBC), T2: 9 weeks (immediately after intervention)

3. Level of cognitive judgments of life satisfaction, defined as subjective well-being and satisfactory quality of life measured with the Satisfaction With Life Scale (SWLS) at T1: before intervention (CCT) or (CCT+WBC), T2: 9 weeks (immediately after intervention)

4. Mood and degree of depressive symptoms measured using Geriatric Depression Scale (GDS-30) at T1: before intervention (CCT) or (CCT+WBC), T2: 9 weeks (immediately after intervention)

### **Key secondary outcome(s)**

Cognitive status assessed using Montreal Cognitive Assessment (MoCA) test at T1: before intervention (CCT) or (CCT+WBC), T2: 9 weeks (immediately after intervention)

### **Completion date**

23/05/2019

## **Eligibility**

### **Key inclusion criteria**

1. Written informed consent
2. Age  $\geq 65$  years
3. Cognitively healthy volunteers and with mild cognitive impairment (MCI) (scores in the Montreal Cognitive Assessment Scale (MoCa), score range: 0-30, cut-off points for norm:  $>26$ , 26-30 for MCI)
4. Basic computer knowledge

### **Participant type(s)**

Healthy volunteer

### **Healthy volunteers allowed**

No

### **Age group**

Senior

### **Sex**

All

### **Total final enrolment**

95

### **Key exclusion criteria**

1. Inability to understand questions and written information (presence of any type of severe visual, hearing or motor deficits)
2. Any psychiatric or neurological diagnosis (alcohol and drug abuse, psychosis, suicidal thoughts)
3. Standard contraindications to WBC

### **Date of first enrolment**

01/08/2018

### **Date of final enrolment**

30/12/2018

## Locations

### Countries of recruitment

Poland

### Study participating centre

Lower Silesian Public Library

Rynek 58

Wroclaw

Poland

50-116

## Sponsor information

### Organisation

Wrocław Medical University

### ROR

<https://ror.org/01qp1b93>

## Funder(s)

### Funder type

Other

### Funder Name

Investigator initiated and funded

## Results and Publications

### Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during the current study during this study will be included in the subsequent results publication.

### IPD sharing plan summary

Other

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes