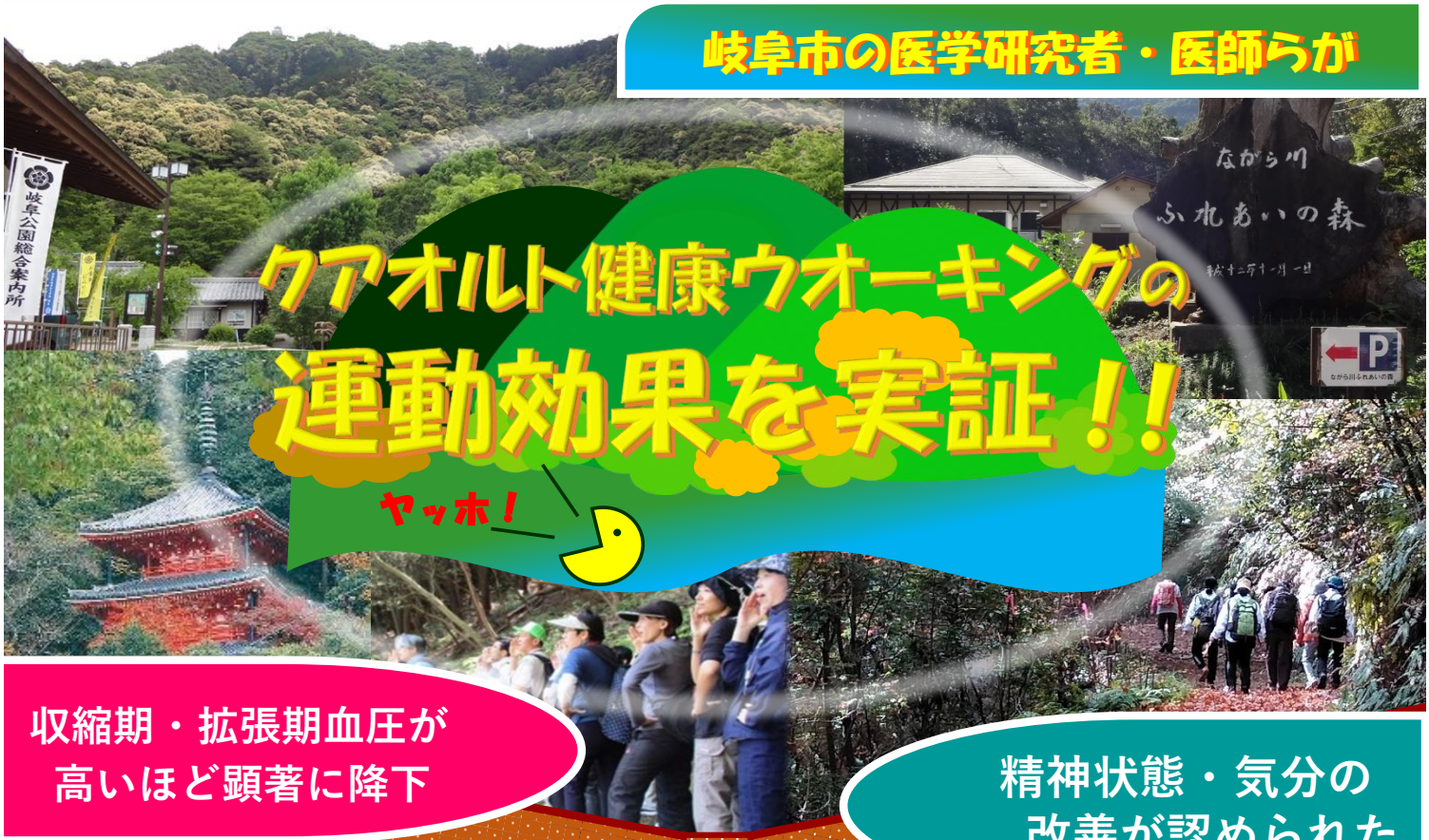
岐阜市の医学研究者・医師らが

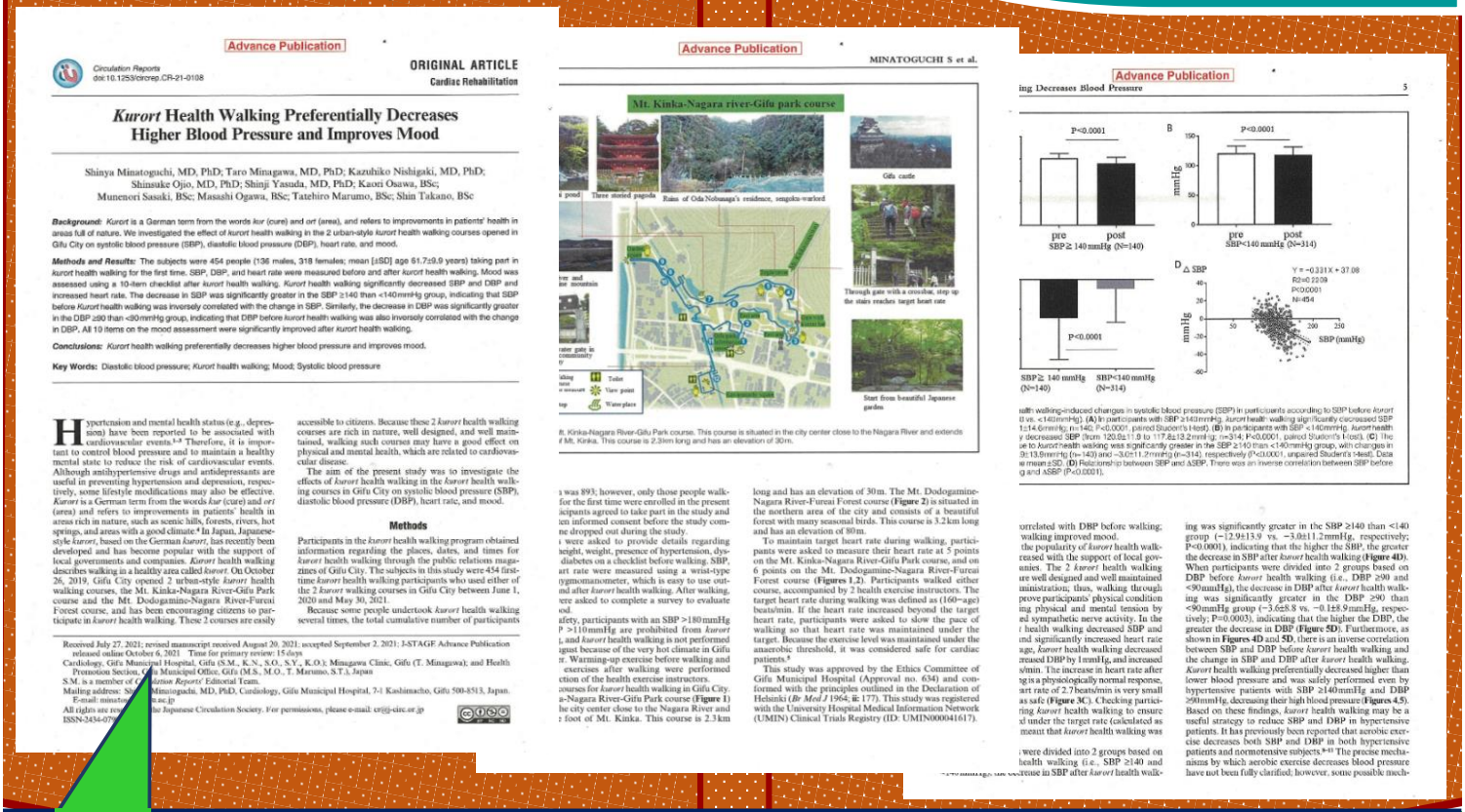
クアオルト健康ウオーキングの運動効果を実証!!

ヤッホ！

収縮期・拡張期血圧が
高いほど顕著に降下

精神状態・気分の
改善が認められた





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ORIGINAL ARTICLE
Cardiac Rehabilitation

Kurort Health Walking Preferentially Decreases Higher Blood Pressure and Improves Mood

Shinya Minatoguchi, MD, PhD; Taro Minagawa, MD, PhD; Kazuhiko Nishigaki, MD, PhD; Shinsuke Ojio, MD, PhD; Shinji Yasuda, MD, PhD; Kaori Osawa, BSc; Munenori Sasaki, BSc; Masashi Ogawa, BSc; Tatehiro Marumo, BSc; Shin Takano, BSc

Background: *Kurort* is a German term from the words *kur* (cure) and *ort* (area), and refers to improvements in patients' health in areas full of nature. We investigated the effect of *kurort* health walking in the 2 urban-style *kurort* health walking courses opened in Gifu City on systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate, and mood.

Methods and Results: The subjects were 454 people (136 males, 318 females; mean [±SD] age 61.7±9.9 years) taking part in *kurort* health walking for the first time. SBP, DBP, and heart rate were measured before and after *kurort* health walking. Mood was assessed using a 10-item checklist after *kurort* health walking. *Kurort* health walking significantly decreased SBP and DBP and increased heart rate. The decrease in SBP was significantly greater in the SBP ≥140 than <140mmHg group, indicating that SBP before *Kurort* health walking was inversely correlated with the change in SBP. Similarly, the decrease in DBP was significantly greater in the DBP ≥90 than <90mmHg group, indicating that DBP before *kurort* health walking was also inversely correlated with the change in DBP. All 10 items on the mood assessment were significantly improved after *kurort* health walking.

Conclusions: *Kurort* health walking preferentially decreases higher blood pressure and improves mood.

Key Words: Diastolic blood pressure; *Kurort* health walking; Mood; Systolic blood pressure

Hypertension and mental health status (e.g., depression) have been reported to be associated with cardiovascular events.[1-3] Therefore, it is important to control blood pressure and to maintain a healthy mental state to reduce the risk of cardiovascular events. Although antihypertensive drugs and antidepressants are useful in preventing hypertension and depression, respectively, some lifestyle modifications may also be effective. *Kurort* is a German term from the words *kur* (cure) and *ort* (area) and refers to improvements in patients' health in areas rich in nature, such as scenic hills, forests, rivers, hot springs, and areas with a good climate.[4] In Japan, Japanese-style *kurort*, based on the German *kurort*, has recently been developed and has become popular with the support of local governments and companies. *Kurort* health walking describes walking in a healthy area called *kurort*. On October 26, 2019, Gifu City opened 2 urban-style *kurort* health walking courses, the Mt. Kinka-Nagara River-Gifu Park course and the Mt. Dodogamine-Nagara River-Fureai Forest course, and has been encouraging citizens to participate in *kurort* health walking. These 2 courses are easily accessible to citizens. Because these 2 *kurort* health walking courses are rich in nature, well designed, and well maintained, walking such courses may have a good effect on physical and mental health, which are related to cardiovascular disease.

The aim of the present study was to investigate the effects of *kurort* health walking in the *kurort* health walking courses in Gifu City on systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate, and mood.

Methods

Participants in the *kurort* health walking program obtained information regarding the places, dates, and times for *kurort* health walking through the public relations magazines of Gifu City. The subjects in this study were 454 first-time *kurort* health walking participants who used either of the 2 *kurort* walking courses in Gifu City between June 1, 2020 and May 30, 2021.

Because some people undertook *kurort* health walking several times, the total cumulative number of participants

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Cardiology, Gifu Municipal Hospital, Gifu (S.M., K.N., S.O., S.Y., K.O.); Minagawa Clinic, Gifu (T. Minagawa); and Health Promotion Section, Gifu Municipal Office, Gifu (M.S., M.O., T. Marumo, S.T.), Japan

S.M. is a member of *Circulation Reports*' Editorial Team.

Mailing address: Shinya Minatoguchi, MD, PhD, Cardiology, Gifu Municipal Hospital, 7-1 Kashimacho, Gifu 500-8513, Japan. E-mail: minatos@...ac.jp

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ft. Kinka-Nagara River-Gifu Park course. This course is situated in the city center close to the Nagara River and extends f Mt. Kinka. This course is 2.3km long and has an elevation of 30m.

was 893; however, only those people walk- for the first time were enrolled in the present icipants agreed to take part in the study and ten informed consent before the study com- ne dropped out during the study.

were asked to provide details regarding height, weight, presence of hypertension, dys- diabetes on a checklist before walking. SBP, art rate were measured using a wrist-type ygmomanometer, which is easy to use out- nd after *kurort* health walking. After walking, ere asked to complete a survey to evaluate od.

afety, participants with an SBP >180mmHg P >110mmHg are prohibited from *kurort* , and *kurort* health walking is not performed gust because of the very hot climate in Gifu r. Warming-up exercise before walking and exercises after walking were performed ction of the health exercise instructors. courses for *kurort* health walking in Gifu City. e-Nagara River-Gifu Park course (**Figure 1**) he city center close to the Nagara River and foot of Mt. Kinka. This course is 2.3km long and has an elevation of 30m. The Mt. Dodogamine-Nagara River-Fureai Forest course (**Figure 2**) is situated in the northern area of the city and consists of a beautiful forest with many seasonal birds. This course is 3.2km long and has an elevation of 80m.

To maintain target heart rate during walking, participants were asked to measure their heart rate at 5 points on the Mt. Kinka-Nagara River-Gifu Park course, and on 6 points on the Mt. Dodogamine-Nagara River-Fureai Forest course (**Figures 1,2**). Participants walked either course, accompanied by 2 health exercise instructors. The target heart rate during walking was defined as (160−age) beats/min. If the heart rate increased beyond the target heart rate, participants were asked to slow the pace of walking so that heart rate was maintained under the target. Because the exercise level was maintained under the anaerobic threshold, it was considered safe for cardiac patients.[5]

This study was approved by the Ethics Committee of Gifu Municipal Hospital (Approval no. 634) and conformed with the principles outlined in the Declaration of Helsinki (*Br Med J* 1964; **ii**: 177). This study was registered with the University Hospital Medical Information Network (UMIN) Clinical Trials Registry (ID: UMIN000041617).

alth walking-induced changes in systolic blood pressure (SBP) in participants according to SBP before *kurort* ll vs. <140mmHg). (**A**) In participants with SBP ≥140mmHg, *kurort* health walking significantly decreased SBP 1±14.6mmHg; n=140; P<0.0001, paired Student's *t*-test). (**B**) In participants with SBP <140mmHg, *kurort* health y decreased SBP (from 120.8±11.8 to 117.8±13.2mmHg; n=314; P<0.0001, paired Student's *t*-test). (**C**) The ue to *kurort* health walking was significantly greater in the SBP ≥140 than <140mmHg group, with changes in 3±13.9mmHg (n=140) and −3.6±11.2mmHg (n=314), respectively (P<0.0001, unpaired Student's *t*-test). Data e mean±SD. (**D**) Relationship between SBP and ΔSBP. There was an inverse correlation between SBP before g and ΔSBP (P<0.0001).

orrelated with DBP before walking; walking improved mood. the popularity of *kurort* health walk- reased with the support of local gov- anies. The 2 *kurort* health walking re well designed and well maintained ministration; thus, walking through prove participants' physical condition ing physical and mental tension by ed sympathetic nerve activity. In the health walking decreased SBP and nd significantly increased heart rate age, *kurort* health walking decreased eased DBP by 1mmHg, and increased /min. The increase in heart rate after gis a physiologically normal response, art rate of 2.7 beats/min is very small as safe (**Figure 3C**). Checking partici- ring *kurort* health walking to ensure d under the target rate (calculated as meant that *kurort* health walking was

were divided into 2 groups based on health walking (i.e., SBP ≥140 and decrease in SBP after *kurort* health walk- ing was significantly greater in the SBP ≥140 than <140 group (−12.9±13.9 vs. −3.6±11.2mmHg, respectively; P<0.0001), indicating that the higher the SBP, the greater the decrease in SBP after *kurort* health walking (**Figure 4D**). When participants were divided into 2 groups based on DBP before *kurort* health walking (i.e., DBP ≥90 and <90mmHg), the decrease in DBP after *kurort* health walking was significantly greater in the DBP ≥90 than <90mmHg group (−3.6±8.8 vs. −0.1±8.9mmHg, respectively; P=0.0003), indicating that the higher the DBP, the greater the decrease in DBP (**Figure 5D**). Furthermore, as shown in **Figures 4D** and **5D**, there is an inverse correlation between SBP and DBP before *kurort* health walking and the change in SBP and DBP after *kurort* health walking. *Kurort* health walking preferentially decreased higher than lower blood pressure and was safely performed even by hypertensive patients with SBP ≥140mmHg and DBP ≥90mmHg, decreasing their high blood pressure (**Figures 4,5**). Based on these findings, *kurort* health walking may be a useful strategy to reduce SBP and DBP in hypertensive patients. It has previously been reported that aerobic exercise decreases both SBP and DBP in both hypertensive patients and normotensive subjects.[6-11] The precise mechanisms by which aerobic exercise decreases blood pressure have not been fully clarified; however, some possible mech-

湊口信也岐阜大学名誉教授（岐阜市民病院心不全センター長）ら循環器内科学の研究者、臨床医師らが、岐阜市主催クアオルト健康ウオーキング講座初参加者454人から同意を得て提供されたウオーキングの前後に測定した血圧データ及びウオーキング後の精神状態・気分データを分析し上記を実証しました。この研究成果は、世界に向け英文で発表しています。

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