

Behaviour of persons using the Finnish sauna treatment

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Summary

Introduction. The aim of this study was to analyze the Finnish sauna treatment, carried out on the physically active persons in aspect of the predicted (anticipated) health risk, connected with the sauna treatment.

Material and methods. 64 persons (39 males and 25 females) aged 22-47, performed various kinds of the physical activity and used the sauna treatment after it. The authors-made questionnaire, including the closed questions in subject of the particular stages of the sauna treatment, problems with the sauna treatment after the effort, proper hydration problem before and after the treatment as well as the indications and contraindications to the sauna treatment.

Results. In all the inquired persons there were observed the improper methodics of the sauna treatment, disagreeing with the scientifically legitimated and widely accepted one. This problem causes especially the particular stages of the treatment in the sauna cabin, appliance of the treatment in connection with the physical effort, hydration and indications to the treatment as well as the direct and indirect contraindications.

Conclusions. Results of our investigations show the immediate necessity of the wide popularization of the safe behaviour in the Finnish sauna, especially among the physically active persons who perform their activity with the sauna treatment. This aspect seems to be extremely important because of the increasing number of the biological renewal centers, hotels and SPA centers offering the sauna treatment for their clients.

Introduction

The Finnish sauna, also called dry sauna, is the one of the most popular thermal treatments. The sauna cabin consists of the small chamber equipped with the electric stove and wooden benches located on 3 levels. During the sauna treatment, person enters nude to the sauna cabin and seats or lies down on the bench. According to the adaptation to the temperature, he passes the higher bench level. The relative humidity in sauna aims 10% and temperature on the head level – 80-90°C. Indicated time of the sauna treatment depends on the aim of treatment and lasts about 5 to 30 minutes. The full cycle of the sauna treatment consists from one to maximally three enters. In about 2-3 minutes before the end of the treatment it's recommended to pour some water onto the hot stones to increase the humidity for relax and stimulation of the organism. After the exit from the sauna cabin the chilling of the body is recommended and next the resting by 10 to 20 minutes [1,2,3].

Conditions in sauna seem to be a significant load for the organism. Stay in the sauna cabin in condition of combined high temperature and humidity switches off some adaptation

mechanisms, i. e: thermoregulatory, circulatory as well as hormonal ones, with their purpose of the protection from overheating. Because of the intensive sweating the hypohydration occurs, so the hydration and electrolyte supplementation is recommended in both time moments: before and after the treatment, especially in the connection with the physical activity. [1,4,5].

Material and methods

The research work was carried out on the 64 healthy persons (39 males and 25 females) at age between 22 and 47 (mean 32 years), performing recreational physical activity in the fitness clubs (gym, aerobic, swimming) and using the sauna treatment after the effort. The authors – made questionnaire includes 34 questions in subject of the methodics, feeling of comfort before and after the treatment and the principles of the connecting of the physical activity with the sauna treatment as well as the hydration and indications towards the sauna usage.



Results

In opinion of the inquired persons, they keep the healthy and active lifestyle, although almost 12,5 % of them declare active tobacco smoking. Analysis of frequency of the sauna treatment appliance shows that 15,6 % of inquired persons use the sauna systematically (at least three times per week), 20,3% - once a week, 42,2% once a month, and 21,9% occasionally. Temperature in the sauna cabin is between 70 to 110 degrees. During the one cycle only 7,8 % of inquired persons enter more than three times, approximately 60,9% enter three times, 10,9% - two times and 20,3% of the enter once. Particular time of staying in the sauna cabin lasted 5 to 10 minutes (4,7%), 10 to 15 minutes for 26,6%, about 20 minutes - 43,8% persons and 25% of inquired - 30 minutes or more. The significant majority (57,8 %) uses sauna treatment nude, 42,8% use bath towels or clothes (i.e. swim suit). 42,2% of inquired persons use single pouring of the hot stones by water, every time they enter the sauna cabin (27 persons). In this group the pouring of stones in the beginning of treatment practice 18 among 27 persons, during the treatment - 2 persons and in the end - 7 persons. Repeated pouring during the single enter use 48,4% of inquired persons (31 ones), and pouring in the end of the last enter in the cycle use 4,7%. Equal number of inquired persons declares no pouring at all.

Body chilling after the sauna treatment is declared by all the investigated persons, but between the following enters it's declared only by 57,8%, reversely to the rest who use the warm shower or nothing. The inquiry shows that the significant part of inquired persons doesn't chill the head, especially women (10,9%). About 68,8% of persons consider their sweating to be proper, 26,5% think it's insufficient, and 4,7% declare no sweating. None of them declared the additional hydration for the future sauna treatment. All the inquired persons declare the water supplementation during the sauna treatment, and 50% do it for some hours after the treatment. The most popular liquids are: the mineral water (71,9%), alcohol, especially beer (10,9%), 9,3% - aerated drinks, 4,7% - isotonic drinks and 3,1% - fruit or vegetable juices. Great majority (75%) use the sauna treatment in 15 to 30 minutes after the physical effort, 7,8% - between 30 and 60 minutes after the effort, 10,9% use sauna, and 6,3% of the inquired persons declare not to use sauna the same day they were practising. Almost half of inquired (46,9%) hydrate their organism during or after the effort. Inquired persons consider even single treatment in sauna to be profitable for their immunity 45,3%, body mass reduction 32,8%, relaxing 79,7%. Also they consider sauna to be recommended for the persons who live in the permanent emotional stress (43,8%), or professional pressure (93,8%), as well as after the significant physical

Table 1. Symptoms of discomfort after the treatment in the sauna

| Symptoms of discomfort after the treatment in the sauna | | | | |
|---|--------------------------|------|--------------------------|-----|
| | on the day of treatment | | day after treatment | |
| | number of people n=64 | % | number of people n=64 | % |
| drowsiness or sleep disturbances | 3 | 4,7 | 4 | 6,3 |
| weakness, increased fatigability | 4 | 6,3 | - | - |
| headache or dizziness | 2 | 3,1 | 1 | 1,6 |
| nausea or vomiting | 1 | 1,6 | - | - |
| irritability, restlessness | 1 | 1,6 | - | - |
| increased thirst | 8 | 12,5 | 2 | 3,1 |
| general malaise, lack of energy | 2 | 3,1 | 4 | 6,3 |
| increased body temperature | 2 | 3,1 | 3 | 4,7 |
| muscle or joint pains | 1 | 1,6 | 1 | 1,6 |
| feeling excessive cold or hot | 7 | 10,9 | 1 | 1,6 |

Tabela 2. Potentially risky behaviour of people using the sauna treatment

| Potentially risky behaviour of people using the sauna treatment | | |
|--|------------------|------|
| Factors of risk in the study group | number of people | % |
| use the sauna immediately after physical exercise (n=64) | 48 | 75 |
| being in the sauna with clothes (n=64) | 27 | 42,2 |
| too frequent watering stones (n=64) | 27 | 42,2 |
| a single residence time in the sauna (longer than 30 minutes) | 16 | 25 |
| use of the sauna by heavy smoker (n=64) | 8 | 12,5 |
| without cooling of the head after treatment in the sauna (n=64) | 7 | 10,9 |
| alcohol consumption in the sauna (n=64) | 7 | 10,9 |
| more than tree times the entrance to the sauna at the time of one cycle (n=64) | 5 | 7,8 |

effort (42,2%). During the inquiry a lot of observations in subject of unbeneficial symptoms connected with the sauna treatment in the day of effort or the day after it was reported. (Tab. 1).

Potential threats connected with the sauna baths in the inquired group of the physically active persons are shown in (Tab. 2).

Discussion

Sauna it's one of the most popular renewal methods although because of its intensity and feature evokes short-term but strong response of the human organism [6].

Generally, sauna is intended to be a mobilizing factor for the adaptive reactions, but there are some situations when it could be dangerous for the health or even life of patient, for example if it's used incompatibly to the treatment methods or if the individual organism tolerance is decreased because of the stress or health status. Obtained results show, that almost all the inquired persons treated sauna incompatibly to the principles of treatment. Authors consider this situation to be negative for the beneficial influence of sauna treatment as well as to be potential threat for the patients health. Estimation of the real negative consequences is hard to define in healthy and respectively young persons, but continuous inappropriate behaving could evoke serious health disorders in the future. (Tab. 1). In Finland is about 2000000 saunas for 5,5 millions of citizens. From among 6 thousands cases of so called sudden death observed in this country, about 1,7% was connected with the sauna treatment. Also, Finland has the one of the highest indexes of the acute infarcts all over the world. There are no achievable scientific data for this problem in Poland [7,8].

Human organism successfully endures the 100°C temperature and the burns are rare. It is possible because of the sweating vaporization as a mechanism of skin chilling, low humidity and the increased blood circulation in the capillary vessels. Staying dressed in the sauna cabin (declared by 42,8% persons) may discriminate the chilling processes. One of the reported reason of this situation is the lack of separate saunas for women and men as well as the lack of knowledge of the aim of such kind of behaving. In this context, declared cases of low sweating (26,5%) or no sweating (4,7%) should be alarming because of low hydrating or thermoregulation disorders. No one declared the purposive hydrating applied before the sauna treatment. More than half of the inquired persons don't hydrate themselves before or during the physical activity, performed before sauna. During the sauna treatment 71,9% persons drink the mineral water, 7,4% drink isotonic drinks. It is considered that the pure water dilutes the blood plasma being adiposous, but increases diuresis and rinses microelements necessary in the proper thermoregulation. Moreover, the excessive intake may cause the hyponatremia. Also the hydration by fruit or vegetable juices (3,1%) is insufficient because of the time of digestion [9].

Almost half of the inquired persons (45,3%) notice, that even single sporadic treatment in sauna improves the organism adaptation to the high temperature. Presently respected knowledge isn't sufficient to confirm the conditions (tempera-

ture, humidity, frequency of enters) necessary to significant and permanent improvement in this subject, but the beneficial effect of the single sauna treatment is very doubtful. Pilch reported, that in 10 women after 7 sauna treatments there were effects of lower oxygen intake, minute ventilation, CO₂ exhaling, heart ratio as well as the rectal temperature and breath index, what may suggest the positive organism adaptation to the high temperature [10].

The inappropriate behaving of the inquired people in subject of the sauna enters and methods of the humidity regulation in the sauna cabin significantly increase the risk of the burns and overheating. In the investigated group, 25% of them stay in the sauna cabin for more than 30 minutes, 42,2% persons pour the stones by water each time they enter to the sauna cabin, what dramatically increase the thermal discomfort. Some people pour the hot stones by water in the beginning of treatment and such behaving provide the lack of understanding for the purpose of it. The Finnish sauna is so called dry sauna and during the most of treatment time it is recommended to keep the low humidity, especially in connection with the high temperature. The increased humidity may cause the thermoregulation dysfunction by convection or conduction, and the sweat vaporization decreases. Organism ineffectively loses water without chilling and accumulates the heating. Approachable results report, that the internal temperature increases for 10°C during each 10 minutes, what suggests that the 30 minutes may increase the organism's temperature to the value of 40 degrees. This situation intensifies if the person undergoing the sauna treatment avoid the chilling between following enters, what concerns about 57,8%. Avoiding the head chilling, mostly in women (10,9%), may cause the dysphoria reported during and after the sauna treatment. [4,11,12].

The alcohol intake during the sauna bath, declared by 10,9% of inquired persons should be considered as extremely risky. Staying in sauna evokes the blood pressure decrease, so the alcohol intake makes this effect deeper, what may cause the arrhythmia, collapsing and other cardiovascular dysfunctions including even the death. Death cases occurred during or in the 24 hours after the sauna bath, reported by various authors, were often engendered by alcohol intake and in Finland there are 20-25 reported cases per year. The alcohol intake in sauna by the Finnish people has its customary origin, in spite of many medical and scientific critic opinions widely popularized in this country. Transferring of this habit on the Polish ground is alarming because of the increased popularity of sauna, and only a few renewal centers introduced in their statutes the prohibition of the alcohol intake in sauna, considering the own responsibility of clients as a priority, what is confirmed by many regulations. This situation needs the widely meant lawful regulations as well as the educational work [13,14,15,16,17,18].

The other reported problem is the sauna bathing of persons being after the significant physical effort (42,2%) and proceedings of persons accepted the sauna treatment immediately after the effort (80%). Particular estimation of this aspect is impossible because of the lack of the analysis of the kind and intensity of the physical effort made by inquired persons, but

in the available literature there are opinions about death cases or the acute heart and cardiovascular dysfunctions occurred in sauna in people who made an extreme effort in gym before the sauna bathing [11,19].

In the authors opinion, the health risk of the sauna treatment is significantly increased in aspect of the lung cancers, cardiovascular diseases, sudden death cases in the group of the active tobacco smokers. In the investigated group, 12,5% of the inquired persons declared the active smoking [14].

Almost half of patients (48,4%) declared the incidental malfunctions or dysphorias in the day of sauna treatment, ¼ of them declared the same in the next day. It is assumed, that this effect is strictly undesirable and may be evoked by too strong stimulation, wrong methodics or contraindications to the sauna bathing in this time. This problem needs more detailed analyses. All the incorrect opinions formulated by the inquired persons in subject of aims and indications to the sauna treatment prove the insufficient knowledge about the sauna methodics and usage. Most of the inquired persons consider sauna to be the successful body mass reduction factor. Cooperman in his work explains the temporary effect of the mass reduction connected with the fluid loss. Author considers, that permanent body mass reduction is possible but there are no effective evidences about its mechanism. Most

of the inquired persons allow the sauna baths as a body mass decrease method in spite of the hazardous health risk connected with the hypohydration as follows: during the physical effort and the sauna treatment [7].

Conclusions

1. In all the inquired persons there were observed the improper methodics of the sauna treatment, disagreeing with the scientifically legitimated and widely accepted one. This problem causes especially the particular stages of the treatment in the sauna cabin, appliance of the treatment in connection with the physical effort, hydration and indications to the treatment as well as the direct and indirect contraindications.
2. The obtained results of our investigations show the immediate necessity of the wide popularization and education of the safe behavior in the Finnish sauna, especially among the physically active persons who connect their activity with the sauna treatment. This aspect seems to be particular important because of the increasing number of the biological renewal centers, hotels and SPA centers offering the sauna treatment for their clients.

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