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IMPACT OF SAUNA BATHING ON GENERAL HEALTH - THE LATEST REPORTS

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ABSTRACT

Sauna bathing is becoming increasingly popular nowadays. This activity is traditional to Finnish culture, as well as being widely used in other countries, especially Scandinavian ones. Today, there are different types of sauna, including, for example, the traditional Finnish sauna, Turkish Hammam and the Russian Banya. The aim of this review is to analyse the impact of sauna bathing on various health-related aspects of human life.

Many studies show the positive effects of saunas on human health. Regarding the cardiovascular system, sauna bathing causes a decrease in: the risk of death from cardiovascular diseases, the risk of sudden cardiac death, blood pressure, among others. In addition, it has a beneficial effect on arterial stiffness, causes changes in cardiovascular biomarkers, and may reduce the risk of thromboembolic disease and stroke. The positive effect of sauna bathing on the respiratory system is due to the fact that sauna can reduce the risk of chronic obstructive pulmonary disease, asthma, pneumonia. In addition, sauna has a beneficial effect on the immune system through makers of inflammation. Moreover, sauna has a positive effect on the nervous system, as it reduces the risk of dementia, Alzheimer's disease and psychosis.

Recent studies from 2017 indicate that sauna bathing has many health benefits and has positive effects on the cardiovascular, respiratory, immune, nervous systems. However, despite the many benefits of sauna use, one must exercise caution and follow safety precautions. More research is needed to confirm all these relationships.

KEYWORDS

Sauna Bathing, Finnish Sauna, Heat Therapy, Cardiovascular Health, Respiratory Health, Immune System, Neuroprotection

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Introduction

There are currently different types of sauna, including the traditional Finnish sauna, the Turkish Hammam and the Russian Banya, all of which differ in design, humidity level and heating source [1]. Sauna bathing is traditional to Finnish culture, as well as being widely used in other Scandinavian countries [2–4]. A historic moment was the 1936 Olympic Games, during which Finnish athletes spread the use of the sauna [5]. Normally, the typical Finn takes a sauna bath at least once a week, usually 2–3 times a week on average [2–4]. Finnish sauna bathing is characterised by exposure to high ambient temperatures for a short period of time [4]. A session in a traditional Finnish sauna lasts for a short period of 5–20 minutes, where the dry air temperature reaches 80°C–100°C (at a relative humidity of 10% to 20%) [1–4,6,7]. The humidity increases from time to time as water is added to the heated stones [1,4]. Sessions can be interspersed with swimming, jumping into icy water, rolling in snow or cold showers to allow the organism to cool down [2–4].

Methodology

The aim of this review is to analyse the impact of sauna bathing on various aspects of human life. For this purpose, key publications were searched by using Pubmed and Google Scholar, as well as other available recent material on the topic, using the keywords: ‘sauna AND health’. The selection of literature cited focused on publications from 2017–2025 in order to select the most up-to-date information.

Results

Effects of sauna on the cardiovascular system

Several studies have been carried out in recent years focusing on the effect of saunas on the risk of mortality from cardiovascular disease (CVD) [8–10]. A study by Laukkanen et al. (2023) suggests that in Caucasian middle-aged and older men with high normal systolic blood pressure (SBP), the increased risk of CVD mortality may be compensated by frequent sauna bathing [8]. Similar results came out of the Laukkanen et al. (2018) research team, where in both middle-aged and older men and women, increased sauna frequency and duration were strongly, inversely and independently associated with CVD deaths [9]. The risk of cardiovascular mortality was also investigated by Kunutsor et al. (2018) in a prospective cohort study of 2,277 men [10]. They assessed the effect of cardiorespiratory fitness (CRF) and sauna bathing frequency on the risk of CVD death [10]. The study found that high cardiorespiratory fitness combined with frequent sauna bathing had a greater protective effect on CVD mortality than the two factors separately [10]. Furthermore, a study by Zaccardi et al. (2017) on a group of 1,621 men aged 42 to 60 years who did not have hypertension at the start of the study shows that regular sauna use may reduce the risk of hypertension, which may account for the reduced cardiovascular risk associated with sauna bathing [11]. A review by Laukkanen and Kunutsor (2019) shows that regular sauna use can result in a significant reduction in the risk of sudden cardiac death (SCD), where when physical activity is combined with sauna bathing, the risk decreases even further than using these activities separately [12]. Sauna has a protective effect on SCD risk through its effects on the cardiovascular system, i.e. reducing inflammation, oxidative stress and arterial stiffness, lowering systemic blood pressure, stabilising the autonomic nervous system and beneficial changes in CVD risk markers from the blood [12]. Few studies have shown that SCD may have been caused by sauna bathing due to dehydration, hypotension, alcohol consumption or cardiac arrhythmias [12]. In addition, sauna bathing also affects various cardiovascular biomarkers in the blood [13–15]. Furthermore, research by Laukkanen et al. (2018) demonstrates that sauna bathing has a beneficial effect on arterial stiffness (reduction in mean carotid-femoral pulse wave velocity after bathing) and causes a decrease in systolic and diastolic blood pressure [14]. Similar conclusions were reached by Pizzey et al. (2021) in their systematic review, in which they demonstrated an effect of heat therapy on lowering systolic and diastolic blood pressure (moderate certainty of evidence), as well as improving flow-mediated dilatation (low certainty of evidence) and lowering mean arterial pressure (low certainty of evidence) [16]. There is also a possible positive effect on arterial stiffness and cutaneous microvascular function, while resting heart rate is unchanged (moderate certainty of evidence) [16]. In addition, a study by Lee et al. (2018) showed, rapid decreases in pulse wave velocity, systolic blood pressure, diastolic blood pressure, mean arterial pressure, left ventricular ejection time and diastolic time after a 30-min sauna session, while decreases in systolic blood pressure and left ventricular ejection time persisted during the 30-min recovery phase [17]. Moreover, Finnish prospective cohort studies suggest that sauna bathing reduces the risk of venous thromboembolism (CVD) [18] and the risk of new stroke in the future [19].

Effects of sauna on the respiratory system

Kunutsor et al. (2017) assessed the effect of sauna frequency on the risk of respiratory diseases such as chronic obstructive pulmonary disease (COPD), asthma and pneumonia, based on the follow-up of a group of 1,935 men aged 42-61 years for an average of 25.6 years [20]. The results of the study showed that middle-aged Caucasian men may have a reduced risk of acute and chronic respiratory diseases such as pneumonia, asthma and COPD with increased sauna bathing frequency [20]. However, further research is needed to confirm this result [20]. When it comes to pneumonia, many studies report a positive effect of sauna bathing on the reduced risk of pneumonia [20–24]. Sauna bathing may reduce the risk of pneumonia by strengthening the immune system, lowering systemic inflammation and directly inhibiting infectious pathogens [19,25]. Kunutsor et al. (2022) examined the effect of high-sensitivity C-reactive protein (hsCRP) and sauna bathing frequency (FSB) on the risk of pneumonia in a prospective cohort study [21]. The results showed that in a population of middle-aged and elderly Caucasian men, the increased risk of pneumonia due to inflammation (hsCRP) could be reduced by frequent sauna bathing [21]. Similar results came out in a study conducted on a cohort of 2210 men aged 42-61, where after taking into account risk factors for pneumonia (BMI, smoking, alcohol consumption, years of education and history of diabetes, coronary heart disease, asthma, chronic bronchitis, tuberculosis), frequent sauna bathing reduced the risk of pneumonia [22]. In addition, another study conducted by Kunutsor et al. (2021) noted that the risk of pneumonia in the future may be significantly more reduced by combining frequent sauna bathing with a high level of physical fitness than by these actions separately [23]. Furthermore, frequent sauna bathing can reduce the increased risk of pneumonia associated with low socioeconomic status [24]. Regarding chronic obstructive pulmonary disease, the results of a study by Kunutsor et al. (2023) on a group in Finnish middle-aged and older men suggests that frequent sauna sessions (3-7 sessions per week) can potentially reduce the incidence of COPD [26]. The reason is that regular sauna bathing reduces systemic inflammation and oxidative stress, and may have a direct effect on lung tissue, reducing lung congestion and increasing ventilation, tidal volume, forced expiratory volume (FEV) and vital capacity [26].

Effects of sauna on the immune system

In the study by Behzadi et al. (2020) 20 participants were randomized to 3 interventions: 1) 1 x 10-minute Finnish sauna bath (80°C, 20% humidity); 2) 2 x 10-minute Finnish sauna bath; 3) a control period outside the sauna for 10 minutes [27]. To determine levels of interleukin-6 (IL-6), interleukin-1 receptor antagonist (IL-1RA) and C-reactive protein (CRP), venous blood was drawn before (≤ 15 min) and after (~ 65 min) each intervention [27]. The results showed that in healthy middle-aged and older adults, typical Finnish sauna sessions sharply increase IL-6 and IL-1RA levels, with CRP showing changes in levels [27]. On the other hand, the opposite results regarding CRP came out in the study by Laukkanen and Laukkanen (2018), where sauna bathing frequency correlated inversely with serum C-reactive protein levels [28]. In a cohort study conducted by Kunutsor et al. (2018) on a population of 2269 people confirmed the effect of frequent sauna bathing on reducing levels of inflammatory markers. This may suggest that reducing inflammation throughout the body through sauna bathing influences various health benefits [29].

Effects of sauna on nervous system

Laukkanen et al. (2017) observed a cohort of 2315 healthy men during a median follow-up of 20.7 (interquartile range 18.1–22.6) years and data analysis was adjusted for various factors including age, alcohol consumption, smoking, BMI, systolic blood pressure, Type 2 diabetes, past myocardial infarction, resting heart rate and serum low-density lipoprotein cholesterol levels. [30]. From this study, it was observed that a moderate (2–3 sauna bathing sessions per week) to high frequency (4–7 sauna bathing sessions per week) of sauna bathing was associated with a reduced risk of dementia and Alzheimer's disease [30]. Similar results came out in a prospective cohort study conducted by Knekt et al. (2020) on a group of 13,994 men and women aged 30-69 years who had not been diagnosed with dementia [6]. The study was conducted over 39 years [6]. After analysis of the data, taking into account risk factors for dementia (lifestyle, sociodemographic and metabolic factors), frequency of sauna bathing was associated with a reduced risk of dementia [6].

Laukkanen et al. (2018) study enrolled 2138 men who were followed up for an average of 24.9 years [31]. The subjects had no history of psychotic disorders, and were divided according to the frequency of sauna attendance (once, 2-3 and 4-7 times a week) [31]. The results, which were adjusted for various risk factors, showed a strong inverse and independent association between frequent sauna bathing and the risk of future psychotic disorders in the general male population [31]. Similarly, in a prospective study of 2221 men aged

42-61 years with no history of psychosis, Kunutsor et al. (2024) noted that frequent sauna bathing (3-7 sessions/week) and moderately high levels of cardiorespiratory fitness (CRF) appear to independently reduce the risk of psychosis, but that frequent sauna bathing, when compared with CRF, may be a stronger indicator of psychosis risk [7].

Safety and contraindications of sauna use

Taking a sauna bath can offer benefits but there is also a risk of negative consequences. A study by McKinnon et al. (2022) suggested that exposure of men aged ≥ 30 years to various heat sources was associated with a moderate reduction in fertility [32]. In addition, Ravanelli et al. (2019) showed that staying in hot baths (40°C) or hot/dry saunas (70°C; 15% relative humidity) for up to 20 minutes is safe for pregnant women, regardless of the stage of pregnancy, as the core temperature does not cross the teratogenic threshold [33]. Furthermore, in a study conducted by Kaiser et al. (2023) sauna injuries were mainly caused by slips/falls and dizziness/syncope [34]. By changing the behaviour of sauna users, the number of potential injuries could be reduced, for example by drinking adequate amounts of water before and after bathing, or wearing non-slip slippers [34]. Additional measures to prevent injuries are: no glass in the sauna, regular maintenance of the wooden parts of the sauna, no alcohol consumption, do not exceed your limits and leave the sauna early if you feel unwell [34].

Discussion

The findings of this review indicate that regular sauna bathing may represent a valuable non-pharmacological strategy for promoting overall health. Across the studies included, the most consistent evidence concerns cardiovascular benefits, where frequent sauna use was associated with lower cardiovascular mortality, reduced blood pressure, improved arterial compliance, and decreased risk of sudden cardiac death. These observations support the hypothesis that repeated passive heat exposure induces physiological adaptations resembling those achieved through moderate-intensity physical activity. Improved endothelial function, reduced arterial stiffness, enhanced vascular reactivity, and attenuation of systemic inflammation may collectively explain the observed cardiovascular protection.

The reviewed evidence also suggests that sauna bathing could have important implications for respiratory health. Frequent sauna use was consistently associated with a lower incidence of pneumonia, chronic obstructive pulmonary disease, and asthma-related outcomes. Although the precise mechanisms remain incompletely understood, heat exposure may improve mucociliary clearance, enhance pulmonary ventilation, reduce airway inflammation, and modulate immune responses. These findings are particularly relevant given the increasing global burden of chronic respiratory diseases and highlight the potential role of sauna bathing as a complementary lifestyle intervention rather than a replacement for established preventive and therapeutic measures.

Another noteworthy finding is the association between regular sauna bathing and reduced systemic inflammation. Several studies demonstrated favorable changes in inflammatory biomarkers, including C-reactive protein and cytokine profiles, suggesting that repeated heat exposure may contribute to improved immune regulation. Since chronic low-grade inflammation is a common underlying mechanism in cardiovascular, metabolic, respiratory, and neurodegenerative diseases, these observations may partly explain the broad spectrum of health benefits associated with sauna use. Nevertheless, inconsistencies between studies regarding individual inflammatory markers indicate that further mechanistic research is needed to clarify the immunological effects of sauna bathing.

The evidence regarding neurological health is particularly promising. Prospective cohort studies consistently demonstrated inverse associations between sauna frequency and the risk of dementia, Alzheimer's disease, and psychotic disorders. Although causality cannot be established from observational data, several biological mechanisms may contribute to these findings, including improved cerebral blood flow, reduced oxidative stress, enhanced cardiovascular health, and decreased systemic inflammation. Considering the growing prevalence of neurodegenerative disorders in aging populations, regular sauna bathing could become an attractive component of comprehensive strategies aimed at maintaining cognitive health. However, randomized controlled trials evaluating cognitive outcomes are still lacking.

An important observation emerging from several studies is that the greatest health benefits appear when sauna bathing is combined with other healthy lifestyle behaviors, particularly regular physical activity and higher cardiorespiratory fitness. These findings suggest that sauna bathing should not be considered an isolated

intervention but rather part of a broader lifestyle approach focused on cardiovascular and metabolic health. This concept aligns with current preventive medicine recommendations emphasizing the cumulative effects of multiple healthy behaviors.

Despite the encouraging evidence, several limitations should be acknowledged. First, the majority of the available data originate from observational cohort studies conducted in Finland, where sauna bathing represents a long-established cultural practice. Consequently, the generalizability of these findings to populations with different genetic backgrounds, environmental conditions, and sauna habits remains uncertain. Second, many studies predominantly included middle-aged or older Caucasian men, resulting in underrepresentation of women, younger individuals, and ethnically diverse populations. Third, considerable heterogeneity exists regarding sauna protocols, including temperature, humidity, session duration, and bathing frequency, making direct comparisons between studies difficult. Finally, observational studies cannot completely exclude residual confounding, as individuals who use saunas regularly often engage in other health-promoting behaviors that may independently reduce disease risk.

From a clinical perspective, the available evidence suggests that sauna bathing may serve as a safe and effective adjunct to healthy lifestyle interventions for most individuals without contraindications. Healthcare professionals may consider discussing sauna bathing as part of comprehensive cardiovascular and general health promotion, while emphasizing adequate hydration, avoidance of alcohol consumption before sauna sessions, and adherence to established safety recommendations. Individuals with unstable cardiovascular disease or other medical conditions should seek medical advice before initiating regular sauna use.

Future research should prioritize well-designed randomized controlled trials investigating optimal sauna protocols, dose-response relationships, and long-term clinical outcomes across diverse populations. Further studies are also required to elucidate the molecular mechanisms underlying heat-induced physiological adaptations and to determine whether the observed associations translate into causal health benefits. Additionally, research evaluating the combined effects of sauna bathing with exercise, dietary interventions, and other lifestyle modifications may provide valuable insights into integrated preventive strategies.

Overall, the available literature indicates that regular sauna bathing is associated with multiple favorable health outcomes affecting the cardiovascular, respiratory, immune, and nervous systems. Although current evidence is encouraging, further high-quality research is required before sauna bathing can be incorporated into evidence-based clinical recommendations with greater certainty.

Conclusions

Recent studies from 2017 indicate that sauna bathing has many health benefits as well as positive effects on the cardiovascular, respiratory, immune, nervous systems. However, despite the many benefits of sauna use, one must exercise caution and follow safety precautions. Although there are many studies on the beneficial effects of sauna on health, more research is needed to confirm all these relationships.

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