Liikkanen, Lassi; Laukkanen, Jari A.

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Lassi A. Liikkanen (Conceptualization) (Methodology) (Formal analysis) (Validation) (Investigation) (Data curation) (Writing - original draft) (Writing - review and editing) (Visualization) (Project administration), Jari A. Laukkanen (Conceptualization) (Investigation) (Writing - original draft) (Writing - review and editing)

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Sauna bathing frequency in Finland and the impact of COVID-19

L.L.: Lassi A. Liikkanen*, J.L.: Jari A. Laukkanen,

Authors

L.L.: Lassi A. Liikkanen*,
School of Engineering, Aalto University, Finland
Aalto Design Factory, P.O. Box 17700, FI-00076 AALTO, Finland
Tel. +358 50 384 1508, Email: lassial@gmail.com

J.L.: Jari A. Laukkanen,
Institute of Clinical Medicine, Department of Medicine, University of Eastern Finland, Kuopio, Finland;
Central Finland Health Care District, Department of Medicine, Jyväskylä, Finland

* Corresponding author

Highlights

• For the first time, this study documents the overall frequency of sauna bathing in Finland

• The majority of 1,000 randomly selected Finnish responding to a survey used the sauna at least once a week

• Men visit saunas more frequently than women and women under 35 were the most infrequent sauna bathers
• Only 7.9% of participants use sauna at least 4 times a week, and thus exceeding an expected threshold for the maximum health benefits out of sauna

• COVID-19 pandemic resulted in a decreased frequency of sauna bathing for 20%, largely attributable to sauna closures

• Sauna bathing in Finland is subject to change due to external conditions, but the high level of access to private saunas maintains their use rate stable

• A large proportion of the participants expressed critical attitudes towards sauna in association with infectious disease such as COVID-19
Abstract

Objectives

Recent research has revealed multiple potential health benefits of frequent sauna bathing. Finland is a country with extraordinary sauna culture and bathing opportunities. However, coronavirus disease 2019 (COVID-19) pandemic introduced regulations and unprecedented closures to shared sauna facilities. In this study we aimed to examine the previously unknown baseline bathing frequency and its possible change during the epidemic.

Design

We investigated several aspects of sauna bathing with self-reports: the frequency, its possible changes, reasons for change, and beliefs about its health effects among a representative sample of thousand Finns aged 18 to 75. This online survey was administered in May 2020.

Results

Before the pandemic, 59% of our respondents had enjoyed sauna at least once a week. Since the pandemic began, up to 23% had reduced or stopped their bathing. This was often due to restricted sauna access. However, 11% of respondents bathed more frequently and attributed this change to seeking relaxation and passing time. These findings demonstrate a surprising flexibility in this health-promoting national pastime. Men were more active bathers than women overall and women under 35 enjoy sauna more seldom than older women. Only 7.9% of all respondents bathed at least four times a week, exceeding a suggested threshold for maximum health benefits.

Conclusions

Finnish people are active sauna bathers. The COVID-19 pandemic demonstrated that the frequency of bathing is dependent on good access to sauna facilities. This flexibility and wide access could be exploited to improve public health in the long term if more frequent bathing became a standard.

Keywords: Finnish sauna; sauna bathing; health benefits, COVID-19
Introduction

Sauna bathing in Finland is a cultural heritage with an exceptionally long unbroken history (1). For centuries, sauna served as the primary solution for cleaning and hygiene. For example, saunas were the regular place for giving birth until the 1960’s when they were replaced by hospitals (2). For a long time, layman and medical practitioners have believed that sauna bathing can induce health benefits (3). Decades of research have addressed this idea. Finnish sauna bathing involves exposure to hot (typically around 80°C / 180°F) and relatively dry environment. Heat exposure elicits substantial changes in the cardiovascular system. During a sauna session, the heart rate may increase up to 120 to 150 bpm, blood pressure rises (4), and profuse sweating begins (5). Thus the cardiovascular response to sauna has been targeted as a mediator of the health benefits. It has been suggested that saunas advance cardiovascular function via improved endothelium-dependent dilatation, reduced arterial stiffness, modulation of the autonomic nervous system, and lowering of blood pressure in long term (6-8).

Some review papers have addressed the various benefits of hyperthermic conditions of sauna for cardiovascular, neurological, and mental health. Prospective epidemiological studies have found that the frequency and duration of Finnish sauna bathing are associated with a reduced risk of cardiovascular mortality, hypertension, stroke and dementia (9-11). Sauna bathing also evokes a number of hormonal responses, although those are mostly temporary (12-14). Recent evidence on sauna use and various disease outcomes indicates a threshold of bathing at least 4 times weekly to achieve most of the beneficial effects of sauna (11, 15-17).

In Finland saunas have been built increasingly in almost every new house and apartment since mid 20th century. As a result, the chances of frequently enjoying sauna are exceptional in Finland and it is possible that sauna-related public health benefits could exist. A study based on 1,628 adult participants from eastern Finland observed that sauna bathing two times per week at a temperature of 76°C (169°F) was most typical, while males and younger participants reported the highest frequency of sauna use (3).

The present study was motivated by the fact that, there is no nationally representative data on sauna bathing frequency in Finland (18). Thus, in the current study, we have assessed the proportion of people who use sauna bathing regularly above the suggested health benefits threshold (9,11). Also, looking at the situation in 2020, we expect many common activities
and lifestyle habits have been disrupted this year. In Finland, preventives measures to deter COVID-19 pandemic were set in March 2020. Consequently public saunas and some of those shared among the inhabitants of a housing company were closed. The present study thus aimed to understand both the baseline (pre-pandemic) sauna behavior as well as its possible change due to the pandemic for future comparisons to international sauna benchmarks (19) as well as to emerging studies that examine lifestyle changes in response to COVID-19 more broadly (20). Examination sauna of sauna in the context of epidemic control is interesting as there is evidence suggesting that sauna bathing could improve immunity against common colds (21).

**Methods**

We designed brief survey section with six items, two of them conditional. It included questions about baseline sauna bathing, recent changes and their reasons, and beliefs about infectious diseases (see Appendix). This survey was embedded in a more extensive electronic survey. One of the other sections of the survey included 28 questions about different lifestyle habits (such as smoking, snacking, home exercise) and their changes during the pandemic.

One thousand pseudo-randomly sampled Finnish respondents were recruited to respond during the final week of May 2020 by a market research company (Bilendii). The sample was balanced and adjusted of 18 to 75-year-old Finns, intended to be nationally representative in terms of many background variables, such as gender, location, age, income, profession, and housing type. Internet use, which is known to be at least 80% in this age group (over 95% among under 65-year-olds) was not controlled for. The survey was distributed only in Finnish language, the mother tongue for 87% of the population.

Participants were compensated as a part of responding to an extensive survey combining several unrelated sections. They were neither informed about the existence of sauna-related questions nor they could choose to only answer those questions, preventing self-selection.

The sample consisted of 501 women and 499 male respondents (ages M=46±16 and M=47±17, women and men M±SD respectively). The sample was collected within five days. With the chosen sampling method, return rate is not a straightforward measure as the majority of participants, from a pool of some 80,000 volunteers, choose to participate without prompting. However, in order to balance the sample and make it representative, supplementary participants such as young men, were separately recruited with a return rate as
low as 10%. The cumulative return rate was unavailable. Data analyses and statistical testing were performed using IBM SPSS 22 and visualized in Microsoft Excel.

Results

The majority of respondents bathed in a sauna at least once a week. The median sauna bathing frequency was “two to three times a week” at baseline. A total of 6.8% of participants never used saunas. Men were more frequent bathers than women, and were twice as likely to bath at least four times a week compared to women, as shown in Figure 1 (11% vs. 5%, respectively; p < .05). Secondly, women reported using sauna “more seldom” or “never” more often than men. Women over 35 years bathed more frequently than younger ladies (Friedman’s test for ranked frequencies across six age groups, p<.05). Among men, no age trend was observed (see Figure 2).

Frequency of sauna bathing in Finland

Figure 1. The reported frequencies of sauna bathing among Finnish 18 to 75-year-olds men and women. (N=998). The error bars denote 95% confidence intervals for the category proportion.
Dwelling type was associated with access to sauna. Although overall 89% had access to a private sauna in block buildings this was only true for 62.4%. Those who lived in a detached house were almost three times more likely to bathe at least four times a week than block building dwellers (12.6% vs. 4.4% respectively), regardless of the respondent’s gender.

**Changes in sauna bathing during the COVID-19 pandemic**

For the majority of sauna bathers, the bathing habits did not change during the COVID-19 pandemic (66.5% of those who ever used sauna; see Table 1 for details). Overall, some 22.7% of participants had reduced their bathing frequency, and 10.7% of participants had increased their bathing frequency during the COVID-19 pandemic. Among those decreasing their sauna bathing, 7.6% had totally given up and 9.0% had considerably decreased bathing.
Table 1. Influence of dwelling type on sauna access, bathing frequency, and its change during the COVID-19 pandemic (N=802).

<table>
<thead>
<tr>
<th>Dwelling type</th>
<th>Share of respondents</th>
<th>Personal sauna access</th>
<th>Median bathing frequency</th>
<th>Decreased (% and N)</th>
<th>Unchanged (% and N)</th>
<th>Increased (% and N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block of houses</td>
<td>47.6%</td>
<td>64.0%</td>
<td>Once a week</td>
<td>37.6% (179)</td>
<td>52.7% (251)</td>
<td>9.7% (46)</td>
</tr>
<tr>
<td>Detached house</td>
<td>31.0%</td>
<td>98.0%</td>
<td>2-3 times a week</td>
<td>9.5% (29)</td>
<td>77.8% (241)</td>
<td>12.7% (39)</td>
</tr>
<tr>
<td>Attached rowhouse</td>
<td>14.8%</td>
<td>91.4%</td>
<td>2-3 times a week</td>
<td>8.9% (13)</td>
<td>81.5% (121)</td>
<td>9.6% (14)</td>
</tr>
<tr>
<td>Total N</td>
<td>934</td>
<td>934</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dwelling type was associated with the change in the frequency of sauna use, as most of the reducers (76.2%) were block house dwellers whereas increases happened among those living detached and attached row-houses (58.9%). It was almost four times more likely for a block house inhabitant to reduce bathing than increase it. Among other dwelling types, the chances were almost equal (9.7% vs. 11.4%, reducers vs. increasers). Among those that did not have access to a private sauna, the reduction was almost four times more likely (55.9% vs. 16.2%, no-sauna vs. sauna).

Participants answered to claims about underlying reasons for change. The most common reason for reduced sauna use was its unavailability (56%), followed by fears of using shared sauna facilities (28%), and unspecified sickness (14%). Among suggested reasons for increased bathing most frequently selected were the need to relax (89%) and spend time (84%). Some mentioned improving immunity (31%) and changing the place of dwelling (22%). The latter is accommodated by the fact that every fourth Finnish household has a secondary home: a cabin or a villa.

In answers to questions about changes in other lifestyle habits, people typically reported their habits unchanged. However, few activities were on the decline. These included smoking, drinking alcohol, gambling online, and sauna and affected under a third of respondents (no change for 69% to 78% of participants). Habits that increased most during COVID-19 included walking and hiking, messaging and calling friends, watching TV, exercising outdoors, and cooking. At least one third of the participants reported increases in these activities (ranging from 37% to 45% of all).
Beliefs about sauna and infectious disease

In response to attitudinal questions about policy and health consequences, we found that participants were generally critical of sauna use and its possible interaction with infectious diseases. The majority (73.5%) agreed with the closure of shared use saunas (a policy question). This was associated with the suspicion that infectious diseases have a risk of transmitting in saunas (66.8% agreed). The respondents generally did not believe sauna could be helpful to cure a flue (26.5% in agreement), deactivate germs and viruses (21.5%), or to boost immunity (33.1%). However, nearly every fourth respondent did not express an opinion (from 26% to 19%). Policy opinion correlated positively with risk perception (r=.558, p<.01), and health-related questions correlated with one another (r range .356 to .602, p<.01).

Opinions were mildly influenced by respondent’s background. Those who bathed more frequently expressed slightly more believe in the positive effects (r=.171, p<.05) and were more critical of the risks and the closure policy (r=-.100, p<.01). Among those who bathed at least four times a week, positive beliefs in cures, deactivation, and immunity were 53% to 79%-units higher than among the respondents on average.

Conclusion

There are millions of sauna facilities around the world, but little is known about their detailed utilization. In this first representative study of sauna bathing on a national level anywhere in the world, we find that Finnish people have a high baseline frequency of sauna bathing. Over 90% of people practice it at least sometimes. Sauna bathing activity was not identical among genders. Women tend to use sauna less frequently than males, and especially women under 35 report more infrequent sauna use. These observations are consistent with earlier studies (16).

In the face of circumstances during COVID-19 epidemic, some people reacted by reducing, others by increasing their bathing frequency. Sauna activity was at least partly influenced by access to saunas, as those with no access to private saunas were more likely to reduce or stop sauna bathing. Interestingly, few reported increased sauna activity during the pandemic and consistently attributed this change to relaxation and enjoyment (see (19)). Based on a comparison to other lifestyle habits, it seemed that decreases in sauna bathing were an exception to the overall health-aware trend and likely explained by the restrictions to sauna
access. In future, it should be possible to evaluate these lifestyle changes across countries affected by the pandemic (see, 20).

It is suggested that regular sauna bathing can be an adjunct to a shortened aerobic physical activity (4) and provide similar benefits as physical exercise, especially for otherwise inactive people. Assessing the potential health effects at a national level, we observed that under 10% of the participants exceeded the proposed threshold for the main health benefits. This suggests that there is still much unrealized potential in Finland to influence national health with saunas. The flexibility in bathing frequency during the COVID-19 pandemic reveals that sauna use can change. Although this study could not address sauna and health-related believes at large, we like to belief that national media publicity for positive health-related research findings may have led to more frequent sauna bathing under these circumstances, here witnessed among people with favorable opinions of sauna. If the causal connection between sauna and health effects was confirmed, then increasing awareness of health benefits could further promote healthier lifestyle habits. However, causal links for either awareness of health effects or the presence actual sauna-related health effects is not examined here, and we could not associate changes in sauna habits with changes in health.

There is a need for additional research and similarly themed studies in representative samples across other sauna-dense countries to replicate findings. Longitudinal studies including questions about health benefits of sauna could add to the knowledge on health promoting sauna. Comparisons to other health-related activities during the COVID-19 pandemic might help to assess if wide-spread and regular sauna use has an effect on the pandemic infection rates. Finally, alternative data collection methods could assess the validity of current findings addressing potential reporting biases inherent to surveys. One of the confounds for this particular study was disregard for the seasonal variation in sauna bathing known to exist during holiday seasons.

**CRedit author statement**
Lassi Liikkanen:
Conceptualization, Methodology, Formal analysis, Validation, Investigation, Data curation, Writing original draft, Writing – Review & editing, Visualization, Project administrations

Jari Laukkanen:
Conceptualization, Investigation, Writing original draft, Writing – Review & editing.

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References


