

The effect of the Turkish bath on women's vital signs and oxygen saturation

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The purpose of this study was to investigate the effect of bathing in the Turkish bath, which is a source of high temperature and moisture, on Turkish women's vital signs and oxygen saturation. The quantitative study was conducted on 275 women using the Turkish bath. The women's blood pressure, pulse and respiratory rate, body temperature and oxygen saturation were measured before and after using the Turkish bath. The difference between vital signs and oxygen saturation before and after bathing was found to be statistically significant. It was determined that while mean blood pressures and mean oxygen saturation of women participants decreased after bathing, their mean pulse rate, mean breathing rate and mean body temperature increased after bathing. Nurses should advise taking precautions against risks that might develop as a result of using the Turkish bath.

Keywords: Turkish bath, Vital signs, Oxygen saturation, Nursing

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Having a temperature of 40–45°C and a high moisture rate Turkish bath is a cultural element for many countries. It has been used as venue for bathing, cleansing, peeling, relaxing, having fun, resolving health problems such as joint diseases and being involved in social activities. Turkish baths are used especially for Turkish women and not used by women and men at the same time in Turkey. Males and females are admitted at separate times. Because the Turkish traditions and Islamic beliefs do not allow women and men to bath together in the Turkish bath. A Turkish bath has sections for changing, bathing and cooling. Bathing section where about 30-40 people could bathe at the same time^{1,2}.

Hot environments like the Turkish bath might also cause bodily water loss, as well as contributing to disruption in electrolyte metabolism and changes in heart rate, breathing rate, blood pressure and body temperature. Systemic disorders, skin diseases and deaths might occur as a result of the hot environment³⁻⁸. Hannuksela and Ellahham² stated that 102 out of 6175 sudden deaths over a one-year period occurred within the first 24 hrs after a sauna. The same study also stated that 2.6% of 2606 sudden deaths that were

encountered throughout one year and examined at the autopsy occurred during or after the process of having a sauna. Eren *et al.*⁹ determined the reason behind 13 out of 15 deaths experienced in the Turkish bath was shown on autopsy examination to result from heart failure.

Studies^{5,6} have suggested a recommended duration for bathing is 5–20 min at 37–38°C. However, Ünübol *et al.*⁶ determined the Turkish bath temperature as 39.72±1.75 °C on average and duration of staying in the bath was 62.30±20.58 min. It has also been reported that bathing in high temperature water for a longer term increases the risk of sudden death. From the literature review, it is evident that some studies have investigated the effects of the Turkish bath, sauna or hot springs on the cardiovascular system²⁻¹⁰. Earlier studies^{2,5} have determined that the sauna increases the cardiac output and accelerates the pulse. In another study by Yorgancıoğlu *et al.*⁸ the participants' pulse rates were 74.1±8.9 min before bathing and 93.9±12.9 min after bathing, body temperature was 36.3±0.44°C before bathing and 37.7±0.5°C after bathing. Similarly, it was 37.5°C before sauna and 37.7°C after sauna in the study conducted by Pawlak *et al.*⁴ In Hannuksela and Ellahham's study² it was observed that body

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temperature increased after sauna. In their studies, Asgar and Yavuz¹¹ determined that each increase of body temperature by one degree Celsius decreases the oxygen saturation level at a rate of 1.2%.

Nurses should be aware of the possible positive and negative effects on health of the cultural practices of individuals for whom they provide care. Turkish bathing is among the indispensable elements of the Turkish culture that is commonly used. To date, however, there has been no nursing study focusing on the effect of the Turkish bath on oxygen saturation and vital signs such as body temperature, pulse, breathing, and blood pressure.

The purpose of this study was to investigate the effect of the Turkish bath on women's vital signs and oxygen saturation.

Methodology

This quantitative study was conducted descriptively. The researcher collected the data between January 2012 and June 2012. A total of 275 women were included in the study. All of the women were eager and voluntarily participated in the study.

The questionnaire form was prepared by the researcher and included women's some characteristics, their reason for using the Turkish bath and their responses to the bath; it was filled in during a face-to-face interview. The women involved in the study had their vital signs and oxygen saturations measured before and after bathing in the Turkish bath. All measurements were performed using the same methods and by the same researcher while the women were in the changing section before and after bathing. Blood pressure was measured using the auscultation method with an aneroid sphygmomanometer when the woman was sitting and her arm was elevated to heart level. Pulse rate was counted from the radial artery with a chronometer for exactly one minute and then the breathing rate was counted. A contactless thermometer was used to measure the body temperature in a way that kept the thermometer approximately 5–8 cm away from the forehead area. Oxygen saturation was measured with the help of a portable pulse oximeter that was put on woman's index finger. All results were written on the registration form and all measurements were performed using the same instruments.

Women, whose first measurements were completed, were allowed to enter the bathing section of the Turkish bath. The exact time of entering the bathing section of the Turkish bath, as well as the

internal temperature of the Turkish bath and water temperature of bathing were measured and recorded. Water temperature was measured twice at different times and the average was calculated.

When women had completed their bathing and came to the changing section to get dressed, the exact time of getting out of the bathing section of the Turkish bath was recorded on the registration form and thus the duration of staying inside the bath area was determined. With the woman in the sitting position, her vital signs and oxygen saturations were recorded once again with the same methods and instruments. The woman's same arm was used during the blood pressure measurement before and after bathing.

Data analysis

The SPSS 15 (Statistical Package for Social Sciences) software program was used to statistically assess the study data. Percentage calculations, mean±SD, and paired-samples *t* test were used for the evaluation of the data.

Ethical considerations

Ethical consent for the study was obtained from the Ethics Committee of Atatürk University Institute of Health Sciences. The researchers explained the purpose and method of the study to the participants and involved volunteers in the study. Furthermore, permission was obtained from the manager of the Turkish bath in order to conduct the study.

Results

It was determined that the average age of women who were involved in the study was 36.53±11.94 years, the duration of staying in the Turkish bath was 170.26±41.86 minutes on average, the average temperature of the bath was 40.01±0.70°C and the average water temperature was 39.3±1.10°C. Women who used the Turkish bath fortnightly comprised 93.5% of the study group. Their reasons for using the Turkish bath included: for bathing and cleansing (79.3%), for relaxing (16%), for health and cure (2.5%), and for having fun (2.2%). Some 14.9% of women stated that they had previously experienced discomfort in the Turkish bath. Regarding these discomforts, 31.7% were related to dizziness and blackout, 12.1% had shortness of breath and palpitation, 19.5% had headache, 12.1% reported cold sweating and shivering, 12.1% had nasal bleeding and 12.1% were related to fatigue (Table 1).

Table 1—Women’s Some Characteristics Associated with Use of the Turkish Bath

Characteristics	Number	Percentage (%)
Frequency of using the Turkish Bath		
Once a week	7	2.5
Fortnightly	257	93.5
Once a month	7	2.5
1–2 times in a year	4	1.5
Reason for using the Turkish Bath		
Bathing-Cleansing	218	79.3
Relaxing-Resting	44	16
Health-Cure	7	2.5
Fun	6	2.2
Experience of discomfort in the Turkish Bath		
Available	41	14.9
N/A	234	85.1
Discomfort experienced in the Turkish Bath (n = 41)		
Dizziness and blackout	13	31.7
Shortness of breath and palpitation	5	12.2
Headache	8	19.5
Cold sweating and shivering	5	12.2
Nasal bleeding	5	12.2
Fatigue	5	12.2
	Mean	Range
Age	36.53 ± 11.94	19-78
Duration of stay in the bath (min)	170.26 ± 41.86	60-275
Internal temperature of the bath (°C)	40.01 ± 0.70	37-41.5
Temperature of the bathing water (°C)	39.3 ± 1.10	27-43

Table 2—Comparison of Mean Vital Signs and Oxygen Saturation of Women Before and After Bathing

Vital Sign	Before Bath	After Bath	t	p
Systolic blood pressure (mmHg)	118.03 ± 11.95	116.43 ± 12.97	2.865	0.004
Diastolic blood pressure (mmHg)	74.25 ± 9.1	72.54 ± 9.1	3.2	0.002
Pulse rate (beats per minute)	80.88 ± 9.1	86.67 ± 12.1	-10.9	0.001
Breathing rate (respirations per minute)	21.85 ± 2.3	24.87 ± 2.2	-22.444	0.001
Body temperature (°C)	36.47 ± 0.1	36.73 ± 0.1	-20.151	0.001
Oxygen saturation (%)	94.71 ± 3.9	92.71 ± 4.7	12.628	0.001

It was determined that the mean pulse rate was 80.88±9.1/min, mean systolic blood pressure was 118.03±11.95 mmHg, mean diastolic blood pressure was 74.25±9.1 mmHg, mean breathing rate was 21.85±2.3/min, mean body temperature was 36.47±0.1°C, and mean oxygen saturation

was 94.71%±3.9 before bathing. The women’s mean pulse rate was 86.67±12.1/min, mean systolic blood pressure was 116.43±12.97 mmHg, mean diastolic blood pressure was 72.54±9.1 mmHg, mean breathing rate was 24.87±2.2/min, mean body temperature was 36.73±0.1°C, and mean oxygen saturation was 92.71%±4.7 after bathing. The difference between blood pressure values, pulse rate, breathing rate, body temperature, and oxygen saturation was found to be statistically significant before and after bathing (Table 2).

Discussion

It is considered that it would be risky for women to stay at a temperature of 40.01±0.7 °C for approximately 170.26 ±41.86 min in the bathing section of the Turkish bath. In this study, women stayed in the Turkish bath for very long periods of time. This suggests that women might experience the risk of cardiovascular problems and sudden death.

The mean temperature of bathing water in the Turkish bath is accepted as hot in accordance with the literature^{12,13}. When the human body is exposed to heat, it uses vasodilatation and sweating to achieve a homeostatic balance and heat loss. These reactions against heat are part of the body’s normal physiological response. When hot water baths are of a long duration and the water used has a high temperature, this might lead to an insufficiency of this physiological response and disturbance of the homeostatic balance. Humans are sensitive to different degrees of hot and cold, and perceive these degrees by means of receptors that are located right under the skin. There are 3–10 times fewer hot receptors than there are cold receptors and thus hot impulses are perceived less than cold impulses. After a short time hot and cold receptors normally adjust to the temperature to which they are exposed¹³. In this study, women’s long stays in the Turkish bath and high temperature bathing could be explained through this adjustment mechanism. The fact that the majority of women who were involved in the study came to the Turkish bath approximately every 15 days and used it for bathing and cleansing shows that the Turkish bath commonly meets the bathing needs in the region. It is important that some women experience discomfort in the Turkish bath (Table 1).

The fact that the mean systolic and diastolic blood pressures of women significantly dropped

after bathing could be associated with the vasodilatation effect of heat on veins. This finding confirms the findings of other relevant studies^{3,5,6,8} (Table 2).

The significant increase in the women's mean pulse rates after bathing might have been caused by the increase of the metabolism rate and cardiac output due to the heat. Caused by high temperature, vasodilatation increases blood flow to the skin surface and decreases blood flow to internal organs. When the sympathetic nervous system gets stimulated, heart rate and breathing rate increase and allows sufficient blood stream and oxygen to vital organs. Findings of this study are in line with findings of other studies and the literature^{2,5,8}.

Increase in the women's respiratory rate could be associated with the fact that temperature increases the metabolic rate and each increase of 0.6°C enhances the metabolism and thus increases the breathing rate¹³. In our study, the mean body temperature significantly increased after bathing. It is a known fact that as the ambient temperature increases, the body temperature also increases. This condition is thought to be caused by the high temperature of the water in the Turkish bath where the study was conducted and while the women were bathing.

The oxygen saturation level of women who participated in the study decreased after bathing. This condition makes us think that the increase in the body temperature increases the oxygen needs of cells and this oxygen deficit cannot be met sufficiently (Table 2).

The statistically significant change in the averages of vital signs and oxygen saturation before and after bathing, for instance the decrease of the blood pressure average from 118 mmHg to 116 mmHg, were not considered clinically risky in terms of mean values. It is considered, however, that long-time exposure to high temperatures might cause risky changes on vital signs.

Limitations

The limitation of this study is that only women were involved in the study.

Conclusion

In consequence of this study, it was determined that while the women's mean systolic blood pressure, mean diastolic blood pressure and mean oxygen

saturation decreased after bathing; their mean pulse rate, mean breathing rate and mean body temperature increased. It was also noted that women stayed in the Turkish bath for a very long period of time.

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