

Don't Let Our Operating Theatre to Be Desert

Nedopustíme, aby se naše operační sály staly pouští

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ABSTRACT

PURPOSE OF THE STUDY

The purpose of this study is to reveal the waste of water by medical staff hand scrubbing preoperatively in the operation theatre, draw attention to the water consumption with small precautions. The study compares motion-sensitive sensor tap with an uncensored classic tap, to assess the difference of water consumption during hand scrubbing.

MATERIAL AND METHODS

The presented study compared two groups; hand scrubbing with sensory tap was enrolled as group A and classic tap with running water was enrolled as group B. Three participants were included in each group. Operation faucets with a motion-sensitive sensor and timekeeper were used in group A. Running water from a tap in 10 seconds was measured with the help of a measuring cup. The water amount after 3 minutes of washing was also measured. The difference between the two obtained data was compared. The obtained data were also multiplied to the global surgical data.

RESULTS

Measurements were performed with a measuring cup and it was measured that 1,250 ml of water is running from faucets in 10 seconds. In group A, faucets were open for 23 seconds whereas in group B faucets were open for 180 seconds. In group A, water utilization was 2,875 ml per person (8,625 ml for three), in group B was the water utilization of 22,500 ml per person (67,500 ml for three). Regarding this data for a single operation, the consumption difference between the two groups was measured as 58,875 ml.

The total count of major surgery worldwide per year is reported to 321,500,000. When this number is multiplied with the obtained data, it is calculated that the total amount of water to be saved between the two groups is 18,928,313 m³. That is equal to one year of water consumption of a city with 125,000 inhabitants.

CONCLUSIONS

In conclusion, as healthcare professionals, it is possible to save enough water as a medium-sized city by changing our handwashing habits in the operation rooms. As a result, water-conserving systems and hand scrubbing education can be very effective in using the natural resources economically and protecting these resources.

Key words: water, operation theatre, washing.

INTRODUCTION

Global warming, climate change and the fact that natural resource is running out is a important topic in today's world. The excessive increase of the human population and the expansion of cities cause insufficient water resources. Nowadays, the most important cause of water contamination is directly associated with human activities.

Although 70% of the world is consist of water, approximately 97.5% of this water is non-potable water like sea and ocean water (4). Therefore, potable water consists of only 2.5% of the world's water (8).

In recent years, with the increasing industrialization and population growth, usable water resources have

decreased (9, 15). Approximately, 1–2 billion people use water without proper sanitation and no access to clean water sources (6). Near 800,000 children die every year because of infection (e.g. cholera) due to polluted water (12).

Sensor taps are systems that have been increasingly used to reduce water consumption. Liters of water are saved every year due to the use of sensory system (3, 5). Our hypothesis is that the reduce of the amount of water spent during hand scrubbing is significantly.

This study aims to compare the amount of running water between two groups, continuous running water (CT) and motion sensory taps (ST).



Fig. 1. Standard sensory taps are designed for operating theatre.

MATERIAL AND METHODS

Two groups were identified. The first group used motion sensory tap with timekeeper (ST) (Fig. 1 and 2). The second group used the same tap with continuous stream (CT) (Fig. 3). The amount of water flowing from a tap at an average speed in 10 seconds (sec) was measured as 1,250 milliliters (ml) with a measuring cup. ST was observed to be open for an average of 23 seconds. On the other hand, the washing time was calculated as 3 minutes (180 seconds) in the CT group. Recommended 3 minutes washing time before surgery was performed in both types of taps. Afterward, total water consumption was calculated by predicting minimum of three participants. The difference between these data was compared with global data.

RESULTS

The amount of water, consumed by a single surgeon for 3 minutes, was measured to 22,500 ml (67,500 ml/3 people) in the CT group, and 2,875 ml (8,625 ml/3 people) in the ST group. According to this data, 58.875 liters of water can be saved by using a sensory tap in a single major operation.

According to official data, 321,500,000 major surgery is performed worldwide per year (13).

When this number is multiplied with the obtained data, it is calculated that the total amount of water to be saved between the two groups is 18,928,313 m³. Considering that the average annual water consumption of a family of three people in an average EU country is 151 m³ (14), we think that with these water savings that can be achieved,

we can meet the annual water need of a medium-sized city with a population of 125,000 only by restricting the water consumption in the operating theaters.

DISCUSSION

The purpose of this study was to emphasize that a simple water-saving model in the operating theatre.

The importance of surgical hand scrubbing due to hygiene and hospital-acquired infection is previously well reported (6, 11).

Alfa-Wali presented that running water in 5–6 seconds equals to 1 liter water and a surgeon consumes approximately 50 liters of water in 5 minutes. The article also mentioned the importance of sensor faucets and emphasized that taps with foot pedals or sensors that may be bought with a cost between £ 400–600 can be a solution to water consumption in the long term (2).

Surgical procedures can not be performed in many regions of the world due to lack of water in hospitals (7). Delayed acute operations ratio was reported %5,1 as a consequence of lack of water.

Previous study illustrated the excess of water consumption during scrubbing preoperatively and measured the amount of wasted water during handwashing. In this study, the amount of water in the time required for scrubbing a person was measured to 20.2 l. Only 5.9 l (29%) of this water is used in handwashing (1). In our study, the running water from the CT group was measured to 22.5 l, in line with the referenced study.

A second option in ensuring water consumption is using alcohol-based hand disinfectants. A previous study illustrated the water consumption in the use of alcohol-



Fig. 2. Surgeon used 3 minute continuous water before surgery.



Fig. 3. Control group used the sensory for limit the water consumption.

based hand disinfectants compared to water-antimicrobial soap. They reported that 931,938 liters of water could be saved in their clinics in a year (10). However, an inference regarding the effectiveness of the use of only disinfectant against water-soap washing was not seen in the study.

The advantage of our presented study is that it is the first study that reports the amount of water savings with two different faucet systems. Also, comparing the obtained data with the number of surgeries worldwide.

One of the disadvantages in this study is that only three participants were included. More than three participants may increase the amount of water consumption. Sensor taps are already available in many operating theatres, however, in many operating theatre in the world, CT system is still existing.

Another disadvantage in ST systems is the loss of time due to the delayed sensibility of the detection in the sensory tap and can also be caused increased water consumption. Surgical participants can be easily contaminated during on and off of the sensory tap. Rewashing

may be needed and this leads to more water consumption.

CONCLUSIONS

The need of water increases in the world and every precaution to protect the existing water is vital. Significant water savings can be achieved by using ST system in the operating theatre. The use of these systems globally can make a significant contribution to reducing the need of water.

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