

## ABSTRACT

Hand hygiene is the cheapest and the most effective opportunity to reduce healthcare – associated infections. In spite of the obvious fact hands of health care workers are still main way of pathogen`s transmissions which caused nosocomial infections.

The guidelines on hand hygiene in health care are clearly defined by the World Health Organization and include clinical indications for hand washing and disinfection and besides it includes notes about proper preparation for the hand hygiene procedure. Since 2007 it has been required in the United Kingdom and more recently in Poland that medical Staff should comply „the bare below the elbows” policy (the BBE policy) during patient care, meaning: short-sleeved white coat, no rings, no watches, no bracelets, short natural nails.

While there are strong evidences that hand hygiene is very important in prevention of healthcare-associated infections, the adherence to rules of BBE policy has an influence on the effectiveness of hand hygiene is uncertain.

The aim of the study was:

1. Analysis the factors influence of compliance on the improper hand disinfection procedure among medical and non-medical personel of different medical facilities in Poland.
2. Assessment of the frequency compliance „bare below the elbows” policy by personnel in Polish medical facilities.
3. Assessment of the influence compliance BBE policy on the propper hand hygiene procedure.

The study was carried out in 2014 - 2017 as a part of a national campaign named „Close the door to nosocomial infections” in scientific cooperation with Medical University in Bialystok. The study involved 7 544 participants employed in 123 medical facilities with various care and therapeutich profiles. Among all the responders 5 271 (69,9%) were representatives of medical staff including 1 470 (27,9%) doctors/physicians and 3 801 (72,1%) nurses and 2 273 (30,1%) non-medical staff.

The place of the study were proper medical facilities. After trainings all volunteers disinfected their hands using Aniosgel 85 NPC fluorescent and then put their hands into COUCOU BOX with UV lamp (Anios Laboratoires company, France). The hand image was assessed on a computer screen. In addition, the questionnaire was completed for each of the participants of the study and following aspects were noted: gender, occupation, work experience, place of work (type of medical facilities and type of hospital wards), dominant hand, wearing rings, bracelets, watches, long-sleeved white coat, lenght of the nails, having tips, polished nails pathological damaged on the skin hand. Moreover, it was also noted which time participants took part in the study.

Proper hand disinfection was demonstrated in 64,7% of health care workers who participated in the study, the comparable frequency among medical personnel who were working in hospital (64,9%), clinics (61,6%) and long term care facilities (62,4%) ( $p>0,05$ ). Out of 3 612 participants following deviations in the preparation of hands for hygienic procedure was founded: artificial/polished nails – 35,5%, rings – 34,4%, watches – 30,5%, long sleeved clothes – 28,1%, long nails – 13,4%, bracelets – 9,9%. Moreover, irritated hand skin was founded in 524 (14,4%) subjects. According to the increased number of the deviations occurring in the same time the number of people who disinfect improperly increased: one – 38,2%, two – 48,6%, three – 54,9%, four – 66,4%, five – 74,5% and six – 94,7%.

Improper hand preparation depending on the type of deviations reduced the chance of correctness of hand disinfection procedure from 24% (irritated skin – OR=0.76, 95%CI (0,64; 0,91)) to 62% (long nails – OR=0,38, 95%CI (0,31; 0,46)).

The chance of proper hand disinfection procedure increased with proper hand preparation (OR=2,18 95%CI (1,98; 2,40)), while it decreased practically to zero in the case of six in the preparation of hands to hand hygiene procedure (OR=0,03 95%CI (0,004; 0,23)).

Out of all study subjects in Polish medical facilities, 3 932 of the (52,1%) complied the rules „bare below the elbows” (BBE group). Nurses and non-medical personnel belonged to the BBE group statistically significantly more often than nonBBE (53,2% vs 46,8%, respectively,  $p = 0,001$  and 53,7% vs 46,3%,  $p = 0,006$ ). Different proportions were demonstrated in the group of physicians – nonBBE (53,3%) compared to BBE (46,7%) ( $p = 0,041$ ). Health care workers who adhered the rules of "bare below the elbows" (BBE group) statistically more often correctly disinfected their hands (73,1%) than the nonBBE group (55,5%) ( $p < 0,0001$ ) and this applied to all occupational groups.