REVIEW ARTICLE

SMARTER USE OF LATEX GLOVES IN HEALTHCARE SETTINGS: A REVIEW OF PRIMARY CLINICAL LABORATORY SAFETY

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HOW TO CITE THIS ARTICLE:

Nandan T. M, Veena C. N. "Smarter Use of Latex Gloves in Healthcare Settings: A Review of Primary Clinical Laboratory Safety". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 49, June 18; Page: 8605-8608, DOI: 10.14260/jemds/2015/1244

ABSTRACT: Lab safety is often neglected in developing economies due to increasing cost of personal protective equipment including hand gloves in most of the healthcare settings. Outer surfaces of sample containers invariably get contaminated while samples are collected due to unavoidable practical difficulties in the process. Suffering patients or novice technicians and nurses often fail to follow the stepwise procedural instructions as to 'how to properly collect a sample in a container and handle it?' In view of increasing number of healthcare associated infections, it is worthwhile to prevent unintentional exposure to dangerous bugs and/or to their drug resistance inducible genetic materials and the resulting untoward effects. Prevention of transmission of infection is possible only when barrier protective measures including wearing hand gloves are strictly adhered to whenever samples/sample containers are handled. As per the recommendations of 'standard precautions' that all samples must be considered potentially infectious, adequate precautions must be taken while handling them including adopting novel efficient methods by concerned healthcare workers.

KEYWORDS: Contaminated sample containers, Latex gloves, Laboratory safety.

INTRODUCTION: Outer surfaces of sample containers invariably get contaminated with sample material while samples are collected due to unavoidable practical difficulties in the process especially when patients are instructed to collect sputum, urine or stool samples, when inexperienced technicians and novice nurses collect blood samples and in busy emergency rooms and operation theatres where samples are collected and handed over to sample transport facility, to respective labs. Such sample containers are commonly handled without adequate protective measures by the healthcare/lab personnel and caretakers of patients unaware of the consequences of potential transmission of virulent pathogens. The process of sample collection requires some degree of experience regarding 'knowledge and skill' pertaining to the manner in which they have to be collected which suffering patients or novice technicians and nurses often fail to follow the stepwise procedural instructions as to 'how to properly collect a sample in a container and handle it?'. Also the pediatric and geriatric populations need utmost guidance including somebody actually assisting them in the process. Most of the time, it is assumed that a patient has clearly followed the instructions given by the healthcare worker. For these reasons and as per the recommendations of 'standard precautions' that all samples must be considered potentially infectious, adequate precautions must be taken while handling them including adopting novel efficient methods by concerned healthcare workers and also by patients and their caretakers.^{1,2}

Primary Laboratory Safety Measures: The precautions to be taken include avoiding direct contact with sample containers i.e., not handling them with bare hands, e.g., by always wearing personal protective equipment when they are touched.^{1,2} It is often neglected that even the intact skin is no safe a barrier for transmission of infection e.g., MDR bacteria, HBV etc.^{3,4} It is also commoner to find

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individuals with one or the other abrasions/cuts in their hands most of the time. Moreover, higher risk of transmission of drug resistant organisms or their drug resistance inducible genetic materials by surface to skin or skin to skin contact as described by the mechanisms of microbial transmission cannot be ruled out.^{3,4,5,6} Prevention of transmission of infection is possible only when barrier protective measures including wearing hand gloves are strictly adhered to whenever sample containers are handled.⁷ Further, while opening the containers by the lab personnel, tissue paper fold, if used, will prevent the little amount of sample stuck onto the inner surface of lid to splash on the gloved hands thus preventing soiling. If not and if the presumed minor splash goes unnoticed, would go on to inevitably and unintentionally contaminate other surrounding objects when touched. Even if sample containers are handled as mentioned above and no such splash occurs, one of the hands needs to touch them at least to check patient details. If the same gloved hand is not cleaned or the glove removed before touching any other articles, accumulated apparently dried up sample material from many containers teeming with pathogens will go on to the surfaces of various materials in the vicinity like the worksheets, registers, computers, etc., articles of documentation and other equipment. Decontaminating the sample containers as soon as they are collected is also not feasible as it may damage the labels stuck on the containers.

Smarter use of Antiseptics and Latex Gloves: One possible and rather an easy solution for preventing this sort of multiple work surface contamination would be to apply antiseptics like surgical spirit in the form of hand rubs to cleanse off any infectious apparently dry sample material from the surface of the gloved hands before handling worksheets or registers.^{8,9} This method is an alternative to discarding the worn gloves before touching other objects considering the increasing cost of frequent glove changing especially in laboratory settings. Ethical aspects may not interfere with this technique to sample containers after the samples have already been safely collected from patients. This also removes the risk and 'phobia' of 'contracting' colonization or infection thereafter, although not widely prevalent, exists among healthcare workers and other care givers and thus assures lab safety.

Applying antiseptics onto latex gloves is a debatable topic as there are inconclusive or rather improbable studies and hence mixed opinion among administrators, physicians and scientists regarding this given the variety of microbial pathogens with multiplicities of their modes of transmission.¹⁰ Some experts argue that solvent antiseptics affect integrity of latex and as a result may easily tear off or permit pathogens through.¹ Whereas others point out that the latex is permeable only to the chemical molecules but not to any of the pathogens except when there is damage to its integrity due to normal wear and tear.^{11,12,10} It also appeals to general common sense that direct contamination of hands by touching dried up sample material on outer surface of sample containers may directly expose the handler to probable pathogens or their drug resistance inducible genetic materials. In view of increasing number of multidrug resistant strains of pathogens, both in hospital and community settings, it is worthwhile to prevent even the miniscule of exposure to dangerous bugs and/or to their drug resistance inducible genetic materials and the resulting untoward effects, if present in clinical samples/sample containers. Studies show that there is considerable reduction in number of contaminant organisms when gloves are worn than are not in such situations.^{13,7} Furthermore, perpetuation of such pathogens on the laboratory inanimate articles, if adequate cleaning is overlooked, which is invariably poorly monitored in most of the healthcare settings, would predispose healthcare personnel to become perpetual carriers of multidrug resistant

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'pathogen commensals' including their kith and kin and complicate an unrelated illness that would otherwise be treated by routine antibiotic therapy. Contaminated sample containers also considerably stink enough to appeal to the 'yuck' sense of any sensible individual. Considering all the above factors it is justifiable to handle sample containers only with protective gloves. To avoid frequent glove changing, which adds on to the cost in resource poor settings, it is quite economical and convenient to apply an antiseptic on to the gloved hands for limited number of times though, to aid in the ergonomics of flow of technical work especially in laboratories provided the sample has not overtly spilt on them when, they should be discarded.

This manner of using latex gloves i.e., by applying antiseptics to ward off microbial transmission is justifiable as compared to surgical procedures during which, blood, antiseptics, saline, etc., wet most of the surface of worn gloves in addition to mechanical handling of surgical instruments, consequences of such prolonged contact and stress and their effects on the latex are weighed against the inevitability of performing the surgery itself and thus is in vogue. After all, "health for all" is universally applicable.

CONCLUSION: So, wiser use of antiseptics on latex gloves while handling specimen containers is justifiable weighing the risks of nuances of microbial transmission against the nuances of ergonomics of flow of technical work in clinical laboratories that would contribute to the prevention of spread of blood borne pathogens and multidrug resistant organisms to healthcare workers and the society at large. This will also considerably reduce the cost of healthcare in developing economies and probably reduce the burden on the environment as well.

ACKNOWLEDGEMENTS: We sincerely thank Dr. R. Ravikumar, Dr. Nagarathna, Dr. Veenakumari, and Dr. Shripad Patil, Department of Neuro-microbiology, NIMHANS, Bengaluru, for their valuable support in bringing out the article.

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 29/05/2015.
Date of Peer Review: 30/05/2015.
Date of Acceptance: 12/06/2015.
Date of Publishing: 18/06/2015.