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Research Article

**EVALUATE THE EFFECTIVENESS OF APPLYING INFECTION  
CONTROL IN MEDICAL LABORATORIES**

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**Abstract:**

*The aim of the study is to know the importance of applying infection control standards in medical laboratories, and the extent to which workers in these laboratories apply these standards, as it shows that these laboratories are keen first on the accuracy of the extracted results and the extent of their reliability or not, and as long as these medical laboratories apply quality standards in infection control, therefore, is trustworthy, its reputation and the reputation of its employees, up to the extent of reassurance of those who deal with it, whether residents or residents of the holy city of Mecca, and whenever quality standards are applied to the fullest extent, they are very close to obtaining the quality standards of CBAHI, joint commission international, or international cap standards. where this questionnaire was distributed to social networking groups (randomly) WhatsApp, where 700 answers were obtained from those (residents of the city of Mecca), out of a total of 600 questionnaires.*

*Keywords: Evaluate, effectiveness, infection control, medical laboratories.*

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**INTRODUCTION:**

Infection control is a system of procedures based on epidemiological examination of the disease with the aim of preventing the occurrence, development, and spread of infectious diseases within health facilities <sup>(1)</sup>. Health is a high priority, and infections remain a major cause of illness globally. Those infections that occur among hospitalized patients and do not appear until after 48 hours of stay are called “hospital origin.” Some prefer the term acquired infection which results in significant morbidity, mortality, and economic burden beyond what would be expected from the patient's underlying disease alone. An important point is that many view infection control as a key issue in the quality of care. In fact, this is the first “success” story in developed countries in using interventions to improve patient care in hospitals. Thus, those who embrace good care must start with infection control, partly because the consequences are so serious without control, and partly because successful interventions have been developed <sup>(2)</sup>. One of the goals of infection control is to prevent and reduce the risk of transmission of infection to healthcare providers at the time of the patient's death<sup>(3)</sup>, “Infection control is everyone's responsibility” is not just a slogan, but rather a way of thinking and a method Work, and responsibility is distributed among all parties involved in the health process, starting with the patient and visitors, passing through the medical staff at various levels, and ending with the executives and strategic planners of health services. <sup>(3)</sup>. Laboratories that handle infectious materials (clinical specimens, bacteria, viruses, and fungi) must follow specific infection control guidelines to minimize risks related to handling patient specimens, cultures, contaminated sharps, and diagnostic equipment. Therefore, its workers must take standard precautions to reduce the risk of infection through laboratories, in addition to providing a safe atmosphere for laboratory workers and others. Laboratory workers face the risk of exposure to disease-causing microbes that are transmitted through the blood, through wounds resulting from handling sharp instruments, or from

exposure of the eyes or mouth to spray, or exposure of infected skin to blood and other body fluids. Concentrated cultures of certain types of microbes also increase the chance of exposure. For infection inside the laboratory, during secondary blood culture operations, mixing, stirring, and centrifugation operations <sup>(4)</sup>. It is necessary for each healthcare institution to develop a guide to infection control policies and procedures, which must include standards for performance in all aspects of infection control. Recommendations must be based on relevant national guidelines and be practical, applicable, necessary, and flexible enough to ensure Implemented. Policies and procedures must also specify infection control indicators and desired results and also include some basis for assessing the risks of each procedure. The comprehensive procedures manual must include policies and procedures for cleaning and disinfecting surfaces and equipment and procedures for isolating patients. Managing spills or accidents with infectious materials, Hygiene, and hand washing procedures, using protective clothing and equipment, Safe handling and transportation of pathological samples, Handling and cleaning contaminated white linen fabric, Handling and disposing of medical and related waste, Handling and disposing of sharp tools, Management of acute injuries. Independent studies by Ignaz Semmelweis in 1847 in Vienna and Sir Oliver Wendell Holmes in 1843 in Boston established a link between hand hygiene in healthcare workers and the spread of hospital-transmitted diseases <sup>(5)</sup>. This led the Centers for Disease Control and Prevention to explain in a statement that it is “a well-documented issue that the most important measure to prevent the spread of pathogens or pathogens is effective hand washing.” <sup>(6)</sup> Hence, hand washing has become a mandatory procedure in most facilities in addition, health care has become required by legislation and regulations in many different states and local areas as well <sup>(7)</sup>. In the United States of America, Occupational Safety and Health Administration (OSHA) standards <sup>(8)</sup> require that employers provide facilities and facilities to allow for the possibility of washing hands, in addition to the necessity of ensuring that workers wash their hands

and any other part of visible skin with soap and water or wash the mucous membranes with running water. Once seen or observed after contact with blood or any other infectious material. The drying process is one of the main important parts of the hand hygiene process. In November 2008, a non-peer-reviewed study was conducted at the European Textile Symposium by the University of Westminster, London, which compared the levels of bacteria found after the use of a paper towel, hot air hand dryer, and a modern jet air hand dryer. The study found that of these three methods, only paper towels reduced the total number of bacteria on the hands, with the matter (using towels) becoming more effective with the use of "air drying." The drying process is one of the main important parts of the hand hygiene process. In November 2008, a non-peer-reviewed study<sup>(9)</sup> was conducted at the European Textile Symposium by the University of Westminster, London, which compared the levels of bacteria found after the use of a paper towel, hot air hand dryer, and a modern jet air hand dryer<sup>(10)</sup>. The study found that of these three methods, only paper towels reduced the total number of bacteria on the hands, with the matter (using towels) becoming more effective with the use of "air drying." The sterilization process aims to kill microorganisms, and it represents the highest level of microbial killing that makes it possible. Hence, sterilizers may be only heat, steam, or liquid chemicals<sup>(11)</sup>. The effectiveness of the sterilizer (such as the vapor barrier "autoclave") is determined through three methods<sup>(11)</sup>. First: Mechanical indicators and gauges on the machine itself indicate the proper operation of the machine. Second: Sensitive heat indicators or tape on sterilization bags that change color may indicate the appropriate levels of heat or steam. Third: (the most important) is represented by biological testing and screening, in which a chemically resistant microorganism (mostly the terminal ends of the bacteria (endospores)) is selected as a standard challenge. If the process is proven and kills the microorganism, that sterilizer is considered effective. It should also be noted that various tools and devices must be cleaned in order for them to be effective in sterilization. Otherwise, debris may represent a protective obstacle, as it blocks microbes and protects them from the deadly sterilization process. Likewise, care must be taken into account and adherence to in a similar manner after the end of the sterilization process in order to ensure that sterilized devices and tools are not contaminated before using them<sup>(11)</sup>. Disinfection refers to the use of liquid chemicals on surfaces at room temperature with the aim of killing microorganisms that cause diseases. Here we note that the disinfection process is less effective than sterilization because it does not kill bacterial

pathogens because it does not kill bacterial spores<sup>(11)</sup>. Hence, we consider that the sterilization process, if implemented appropriately, becomes an effective method for preventing bacteria from spreading. They must be used in the process of cleaning medical devices, equipment, medical gloves, and basically any type of medical instrument that comes into direct contact with blood and sterile tissue. There are four different ways in which such tools or devices can be sterilized: sterilization using an autoclave or autoclave (through the use of high-pressure water vapor), dry heating (in ovens), or through the use of chemical sterilizers, such as glutaraldehydes, Or formaldehyde solutions or through radiation (with the help of chemical elements).

## 2-MATERIAL AND METHODS:

This study started in (the holy city of Mecca in Saudi Arabia), began writing the research and then recording the questionnaire in April 2023, and the study ended with data collection in September 2023. The researcher used the descriptive analytical approach that uses a quantitative or qualitative description of the social phenomenon (Evaluate the effectiveness of applying infection control in Medical Laboratories), this kind of study is characterized by analysis, reason, objectivity, and reality, as it is concerned with individuals and societies, as it studies the variables and their effects on the health of the individual, society, and consumer, the spread of diseases and their relationship to demographic variables such as age, gender, nationality, and marital status. Status, occupation<sup>(12)</sup>, And use the Excel 2010 Office suite histogram to arrange the results using: Frequency tables Percentages<sup>(13)</sup>. A questionnaire is a remarkable and helpful tool for collecting a huge amount of data, however, researchers were not able to personally interview participants on the online survey, due to social distancing regulations at the time to prevent infection between participants and researchers and vice versa (not coronavirus participation completely disappearing from society). He only answered the questionnaire electronically, because the questionnaire consisted of thirteen questions, all of which were closed He only answered the questionnaire electronically, because the questionnaire consisted of thirteen questions closed, all of which were closed. The online approach has also been used to generate valid samples in similar studies in Saudi Arabia and elsewhere<sup>(14)</sup>

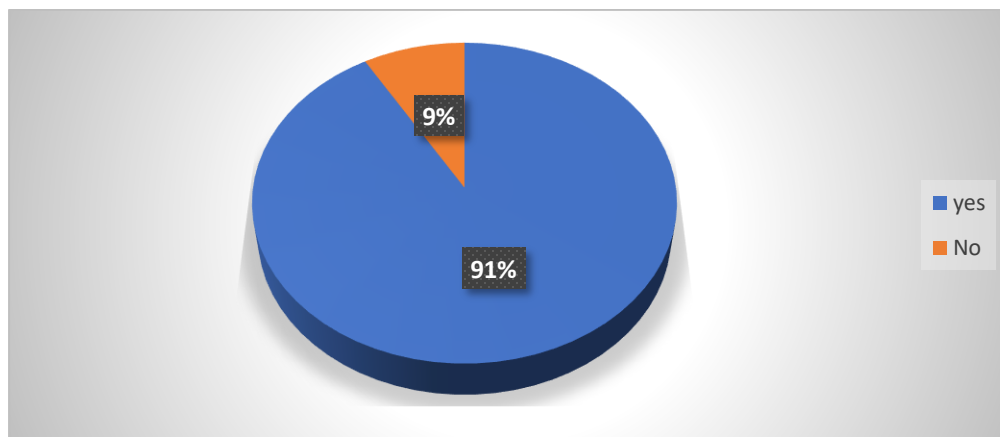
## 3- RESULTS:

The ages of the participants and participants in the research were as follows: 25-34 17%, 35-44 66%, 45-54 14.9%, 55-60 2.1%. As for the gender of the research participants, they were 91.3% male, 8.7%

female. As for the educational status of the male and female participants: primary 0%, intermediate 0%, secondary 2.4%, university 61.7%, master's 31.9%, doctorate 4%. As for jobs (for men): administrators 2.2%, doctors in all categories 2.2%, nursing in all categories 0%, radiology in all categories 0%, laboratory in all categories 95.5%. As for the jobs (females), they were as follows: administrators 6.6%, others 6.6%, radiology in all categories 6.6%, laboratory in all categories 80%, doctors in all categories 0%, nurses in all categories 0%. Regarding the first question: Do you have knowledge of infection control standards in medical laboratories? The answers were yes 95.7%, no 4.3%. As for the second question, which was: Does your laboratory have clear standards for infection control? The answers were the same. The third question was: Do workers of all categories apply infection control standards in the medical laboratory? Yes 74.5%, No 25.5%. As for the fourth question: Have all workers in all categories been trained to apply infection control standards in the laboratory? The answer was yes by 91.5%, no by 8.5%. The fifth question: Have all workers of all categories in the laboratory been trained on correct and proper hand washing methods? The answers were as follows: yes 95.7%, no 4.3%. The sixth question: Have all workers of all categories in the laboratory been trained on how to sterilize hands? The answers were yes by 93.6%, no by 6.4%. The seventh question was about whether all workers of all categories in the laboratory were trained on how to wear and take off masks and gloves in the correct and proper manner. The answer is yes 91.5%, no 8.5%. The eighth question was about whether all

workers (technicians) in the laboratory had been trained on how to sterilize and disinfect the tools used in the laboratory. The answer is yes 80.9%, no 19.1%. The ninth question: Is there an infection control coordinator in the laboratory responsible for directing, advising, and enrolling technicians in training courses on infection control? The answer was as follows: Yes 95.7%, No 4.3%. The tenth question: Does the laboratory have tools for materials spilled on the floor to be used in the event of infection? Yes 93.6%, No 6.4%. The eleventh question: Does the laboratory have a special room for medical waste? The answers were as follows: yes 65.2%, no 34.8%. The twelfth question: Does the laboratory have special containers in which sharp instruments such as needles and glass are placed? The answer was yes 93.6%, no 6.4%. The last question about: Has your laboratory ever obtained a certificate for applying the CBAHI, JCI, or CAP quality standards in the field of the medical laboratory? The participants' answers were 100% yes. We find through this current study that these laboratories apply infection control standards at a high rate (95.7%), as they have written standards and they apply them 95.7%, and they apply them in the medical laboratory at a rate of soon 80%, as they were trained on these standards through training courses, seminars and lectures from Specialists at a rate of 91.5%, such as proper and correct hand washing courses at 95.7%, and how to sterilize hands as well at 93.6%, and the percentage of proficiency in these matters is high, and these places and their workers are very keen on raising the place in which they work and its reputation. (Figure No.1)

**Figure N0.1: Opinions of medical laboratory workers regarding their training in applying infection control standards in the field of work**



**4-DISCUSSION:**

The current study finds that applying infection standards in medical laboratories and their workers is necessary to obtain certification of the standards, whether local or international (Joint Commission International or CAP), the reputation of the place, and the reliability of its results.

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