

# ASSESSING THE KNOWLEDGE OF INFECTION CONTROL PRACTICES AMONG HEALTHCARE WORKERS: A COMPARATIVE STUDY IN HOSPITAL SETTINGS

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## Abstract

Effective infection control practices are essential for minimizing the transmission of healthcare-associated infections (HAIs) and ensuring patient safety. This research paper aims to assess the knowledge of infection control practices among healthcare workers and compare it across different departments and experience levels in hospital settings. The study will utilize a cross-sectional design, targeting healthcare workers from various departments, including doctors, nurses, and support staff, in selected hospitals. A structured questionnaire will be used to assess their knowledge regarding standard precautions, hand hygiene, personal protective equipment (PPE) usage, safe injection practices, and environmental hygiene. The survey will also capture demographic information, years of experience, and previous infection control training received by the participants. Data analysis will involve descriptive statistics, including mean scores and percentages, to assess the overall knowledge level among healthcare workers. Furthermore, the knowledge scores will be compared across different departments and experience levels using appropriate statistical tests. The findings will provide insights into the gaps in knowledge regarding infection control practices among healthcare workers. This information can be utilized to develop targeted educational interventions and training programs to enhance their understanding and adherence to infection control guidelines.

**Keywords:** Infection Control Practices, Healthcare Workers, Knowledge, Hospital Settings, Comparative Study.

## INTRODUCTION

Healthcare-associated infections (HAI) that are also commonly known as nosocomial infections have become a major concern in recent times worldwide. Hospital acquired infections pose a great risk of getting severe infectious and sometimes fatal diseases such as Hepatitis B (HBV), Hepatitis C (HCV) and also Human Immunodeficiency Virus (HIV) infections etc. via the accidental contact with infected blood, secretions or body fluids etc. This not only affect public health and but also severely diminishes the proper functioning of modern healthcare systems (Haque et al., 2018). A study from Canada, stated that, annually more than 200,000 cases are reported to acquire a HAI, among which an estimated 8000 cases are fatal (English et al., 2018). This scenario is also true for the United States and in the Europe, causing severe complications of HAI (Marschang

& Bernardo, 2015). According to the Centers for Disease Control and Prevention (CDC), the definition of HAIs, are the type of infections, either localized or systemic in nature, resulting from the adverse reaction to the presence of any infectious materials or toxicants acquired from any healthcare setups, that was not preliminary present or found symptomatic at the time of admission of a patient to a healthcare facility (Popovich et al., 2019)(Solomkin et al., 2017). Majority of the HAIs are transmitted via healthcare personnel who fail to maintain proper infection prevention practices. Therefore, all the types of healthcare workers like physicians, nurses, healthcare wastes management and disposal workers etc. are the crucial factors in these scenarios, where they are responsible for not only their own protection but also preventing the spread of such HAIs among the patients and other general public. Infection prevention therefore is such a process that puts barrier between the susceptible host and the infectious microorganisms.

Now, HAIs associated morbidity and mortality are preventable via several infection prevention strategies and standard precautions like, proper hand sanitization, safety injection, precautions against contact, droplet or airborne infectious agents, proper patient management, antibiotic stewardship, regular vaccinations, environmental sanitizations via proper disinfection and sterilization etc(Desta et al., 2018)(Geberemariam et al., 2018). For example, all types of healthcare workers (HCWs), who were involved in the caring and management of affected people with the highly transmittable viral pathogens of SARS-CoV-2, were also severely affected too. This scenario caused a serious occupational health hazard to the healthcare personnel worldwide, because of their direct or indirect exposure to the infected individuals. Many literatures suggested that few crucial factors such as absence of proper knowledge, lack of proper training and also misunderstandings among the healthcare workers were the main cause of delayed or absence of proper conclusive diagnosis, severe spreading of the disease along with improper infection control practices. These factors led to the severe spreading of the infectious COVID pathogen among thousand HCWs and also general public.

Regular and extensive training on comprehensive safety programs and strict surveillance are the crucial factors for any infection prevention management. As these real time surveillance data allows infection control managements to detect and identify important HAIs and also to detect any signs of epidemics or outbreaks well ahead (Popovich et al., 2019). Therefore it is well evident, that such abovementioned programs should be executed without any fail by every management committees of healthcare facilities that should have a dedicated infection management team handled by properly trained and experienced infection control healthcare workers. These types of management boards are actually responsible for the proper execution of the various infection control tools and their guidelines, hospital polices for the healthcare workers, patients and also their relatives to follow in the healthcare settings etc(Zingg et al., 2015)(H. A. Khan et al., 2017). Therefore, in short these types of programs entails the execution of educational as well as induction programs on proper infection control guidelines and managements, specially designed trainings to properly educate HCWs and also to address any

shortcomings in healthcare personnel knowledge, attitude and also practices towards the hospital acquired infection control managements etc. Now, healthcare associated infections can be of different origin. Below, we have discussed about a few of them.

## **Infection Control**

Infection control indicates the policies and procedures that are essential to implement for controlling and minimizing infection dissemination in the hospital unit as well as in other clinical settings (Joynt &Gomersall, 2021). Controlling infection helps in preventing the spread of infectious diseases in a healthcare setting or in other health-hazard environments. The contribution of information from the different medical websites or from various studies of how exactly the infections spread is a suggestive measure in preventing the uncontrolled growth of microbes (pathogens), which is the root cause of any infection (CDC, 2016). Additionally, the websites (government or medical) give detailed recommended measures that can be established in any healthcare setting to control the infection.

Infection control refers to the formal entity that was developed in 1950, in the USA (Joynt &Gomersall, 2021). In the later period 1950 - 1960, few hospital units observed: "*healthcare-associated infection*" (HAI) which thereby gives an idea to implement various controlling strategies and measures to prevent the infection from spreading. This particular activity reviews different types of methods that can control the infection rate & their indications highlighting the roles of the different inter-professional teams to follow the principles of controlling infections and thereby improving the outcomes (Joynt &Gomersall, 2021).

## **OBJECTIVES**

- 1) To identify the processes of transmission of pathogenic infection
- 2) To determine the factors associated with healthcare-associated infections

## **RESEARCH METHODOLOGY**

This research aimed to investigate as well as to evaluate the knowledge as well as attitude of healthcare personnel towards proper infection control management, working in private hospitals, at the city of Wuhan, China, via utilizing the survey tool. We also wanted to thoroughly explore the consequences of various infection controls and practice (IPC) policies of the healthcare sectors that might have an impact on the management of hazardous infections contaminations.

Prorogue human has lived as a carrier of emerging pathogens long before civilization has taken its shape in earth. Since then, the situation has been continuously changing till recent times and also maybe in future. It is some of the unhygienic activities of global population that allows epic spread of infections, their immense appearance and flourish. Through this research, the researcher conveniently explored the taxonomy of infection

prevalent pathogens and concurrently discusses the real mergence of microbial threat, especially with the rising consequences of current viral pandemic, Covid-19. The total incident started from China and reached worldwide, however, the infection controlling practices in Chinese healthcare setting are well established and coordinated with relevant complication from Chinese government. But, the worldwide scenario eliminating China, if considered then there is a huge impact of coronavirus infection. Hence, this ascertains the global compliance to hygienic condition, consideration of IPC guidelines and their proper practice in healthcare setting is still in nascent stage. Thus, this chapter would explore all these points through various approaches.

In this study, we wanted to explore the different causes and also consequences of ill managed infection control practices and their impact on both healthcare employees as well as general mass. For this purpose we conducted a survey that consisted of close ended questions to obtain qualitative data.

The contribution of this research methodology has stirred an understanding regarding the management intrusions of healthcare workers in infection control. This chapter has introduced various methods that not only determined the competency level of healthcare authorities and professionals in following proper IPC guideline regarding infection control but also engages the participants whoever has accepted the voluntary acknowledgement of this research study. Through this approach the real understanding of KAP in different healthcare organizations are well established and conferred in the next chapter of this study. To be specific, much new information is established that has not been found in the previous studies. This can be exemplified with the ideas about how healthcare workers are directly associated to develop certain infections when comes in contact with the infected patients. It also shows the occupational risks by acquiring acute respiratory infection (ARI) among the medical workers when proper infection prevention and controlling measures are not maintained.

We used survey methods to help identify the various types of infection control practices performed by the healthcare institutions and also the healthcare employees to find out the association between the knowledge and practice of proper IPC managements and baseline variables. The data gathered from this research would help in better understanding of the importance of proper infection control management and gather insights about the several constraint factors that hamper proper IPC management. This will also help to provide bases for the effective handling of hazardous infections in healthcare facilities to benefit both the healthcare employees, general public as well as the environment.

We also wanted to find out the level of compliance of the healthcare employees with their institution's IPC management practices. After gathering all these information, this study will then help recommend various sustainable developments of IPC management practices. The recommendations will be useful to medical management stakeholders in the formation of effective measures to handle spread of hazardous infections and improve

health service delivery. The findings will also be useful as reference materials for policy makers while making decisions concerning IPC management worldwide.

In the previous chapters, after discussing thoroughly, it is now well evident that improper and unscientific IPC management practices are significantly damaging to any healthcare organization, as the consequences are really huge, costly and sometimes also fatal. Therefore every organization should always be more competent to properly and methodically manage IPC practices via skilful management as well as modern sanitization, disinfection as well as bio-wastes management practices and strategies, especially for the highly hazardous infectious, that can harm the healthcare employees and also the general mass, if not properly handled.

This study therefore aimed to find out different practices and perspectives of the healthcare workers that might affect IPC management of that hospital organization. The undesirable scenario of hospital acquired infections (HAIs) among the healthcare professionals were also studied via different tools to assess their degree of severity and to find out their consequences so that it can be avoided well ahead in the future by both the organizational managements as well as the healthcare employees.

Although there has been several studies on the IPC management practices among healthcare workers, but thorough analysis of worldwide literatures revealed several gaps in research on the current aspects of knowledge, practices as well as level of compliance among healthcare staffs and also its effect on spread of infectious contaminations. This study therefore intends to address the research gaps and thoroughly study all the current and methodical aspects of IPC managements and the future practices that should be followed to lower the incidents of spread of hazardous infections contaminations.

In many sections across the study, the guidelines of medical authoritative organization, WHO has been discussed for acknowledging the convenience of infection control practices and according the critical understanding of anti-microbial resistance. To be specific, the prevalence of HAI is strictly related to AMR factor. Secondary data has been collected from previous studies which show that about 7.6 per cent HAI rate is prevalent in the developed nations; however, that same rate is nearly 10 per cent in the developing nations. Now it is time to gather primary data (both qualitatively and quantitatively) to bring relevance in this study bestowing to current information in this ground. Hence, this chapter has explored several different aspects related to knowledge and practices developed by HCWs in their work setting.

This chapter will also discuss all the research tools and techniques applied in this study, to achieve a successful and detailed conclusion about the problems discussed earlier. According to literatures, different research techniques are the tools for solving a research problem in a scientific and systemic manner.

It involves thoroughly understanding the research problem, developing an acceptable and methodological research design, developing and implementing proper data collecting

techniques and then analyzing the collected data via proper scientific tools to reach a significant conclusion.

As a result, the following research objectives were selected via an in-depth review of worldwide literatures relevant to the above mentioned area:

### **Primary objectives**

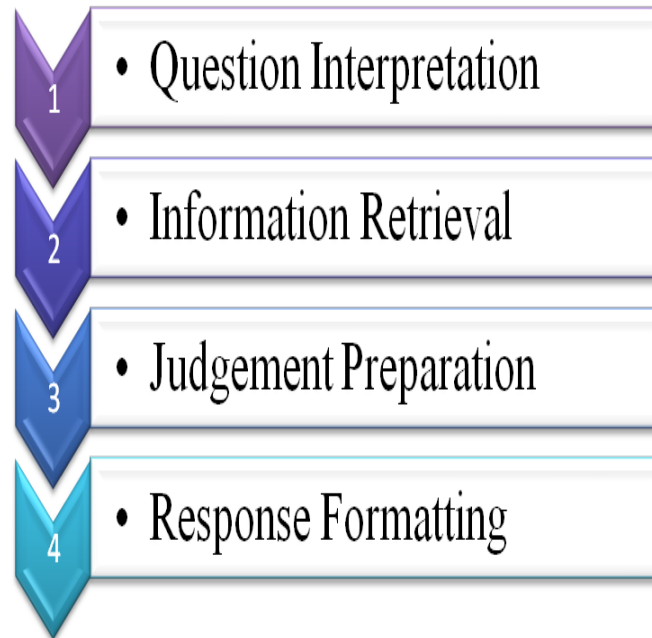
Therefore the primary objective of this study was to put together all the detailed findings on the current status of IPC management in the healthcare sectors worldwide, the level of practices as well as level of compliance of the healthcare staffs towards the IPC via surveying them, so that those findings can further help any healthcare organizations to make appropriate changes in their infection control practice policies to avoid situations like the spread of infectious diseases among both the healthcare personnel and the patients, in the future.

### **Survey responding is a psychological process**

Literatures suggest that the, the whole process of responding to a particular study survey is a psychological process. This process includes the following steps.

- **Cognitive model**

The cognitive processes, is the process, that people use while answering survey questions. The participants first evaluate the questions, fetch appropriate detailed facts from their past memories, build up a probable judgment and finally transform their judgment to a response. The following figure 2 represents a schematic model of these cognitive processes, used by us while responding to a survey.



**Figure 1: Flowchart of the cognitive processes involved in a respondent's mind, while answering questionnaires of survey studies**

To elaborate this, we must consider the fact that, although survey questions might seem straightforward to the researcher, but when answering them, respondents might face difficulties while answering them properly.

What the respondents do at first is, they try to interpret the questions properly, by understanding all possible aspects. After that, they try to fetch the appropriate information from their memory to properly answer them. Now, here is a tricky part. It is completely uncertain that, what kind of information a person will retrieve from their memory and how they will use that, while answering the questions. After recovering the memories, the respondents then use that information and arrive at a tentative judgment. Then comes the last part, where the respondents, builds up the best possible tentative answers according to the response options format provided by the surveyor (for e.g., a rating on a 1 to 5 scale).

## **DATA ANALYSIS**

In the current chapter, the researcher will analyze the data that has been collected from the respondents. To start the discussion, the researcher will draw the descriptive frequencies of the relevant variables. A brief discussion will be made on the demographic variables which will portray the stages of life each respondent is in. A central part of the discussion will be occupied by both parametric and non-parametric tests. These will include *t*-test, Chi-square tests and a discussion on the factor analysis. The researcher

proposes to discuss the rotation techniques, the translation of axes and reasons pertaining to the selection of a rotation technique and translation.

### Socio-demographic profile of the sample

This section of the research will briefly discuss the socio-demographic variables pertaining to socio-demographics. The reason why the demographic variable has been considered as a part of the study is the fact that healthcare is a highly demanding job and generates a good amount of stress which is dependent in varying degrees on the demographic factors (Garrosa et al., 2008). One of the ways by which such stress manifests itself is burn-out in the healthcare workers (Taleghani et al., 2017). Further it has been found that as the number of years in service increases, HCWs start to show a lack in their propensity to observe the infection control rules properly. Further, it has been found that in many cases, the HCWs have sufficient knowledge of the infection control techniques, but because of their level of awareness and poor to average practices, the level of overall cleanliness and hygiene of the hospital (Nasiri et al., 2019). Apart from that it has also been found that such extensive hours also reduce the thinking capacities and the general intelligence of the HCWs (saeid et al., 2013). In many cases it has been found that it affects both the family life and the professional life of the HCWs (Kuo et al., 2020; Liu & Aunguroch, 2019; Mo et al., 2020)

**Table 1: Gender - wise distribution of respondents**

		<b>Gender</b>			
		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	Male	210	60.0	60.0	60.0
	Female	140	40.0	40.0	100.0
	Total	350	100.0	100.0	

In the table above, it can be seen that 60% of the respondents are male candidates and 40% of the respondents are female. It is further seen that both 105 male and female respondents are married. The researcher assumes that family burden may be a cause if the working hours are extensive. This is reported by the table below.

**Table 2: Distribution of marital status of the respondents as plotted across gender**

		<b>Marital Status</b>		
		<b>Married</b>	<b>single</b>	<b>Total</b>
Gender	Male	105	105	210
	Female	105	35	140
	Total	210	140	350

The other demographic profiles are reported by the tables below.



**Table 3: Distribution of the age of the respondents**

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	175	50.0	50.0	50.0
	31-40	140	40.0	40.0	90.0
	41-50	35	10.0	10.0	100.0
	Total	350	100.0	100.0	

**Table 4: Distribution of the marital status of the respondents**

Marital Status					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	210	60.0	60.0	60.0
	Single	140	40.0	40.0	100.0
	Total	350	100.0	100.0	

**Table 5: Table showing the number of families of the respondents**

Number Of Family Members					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 members	210	60.0	60.0	60.0
	4 members	70	20.0	20.0	80.0
	more than 4 members	70	20.0	20.0	100.0
	Total	350	100.0	100.0	

## CONCLUSION

A structured questionnaire will be used to assess their knowledge regarding standard precautions, hand hygiene, personal protective equipment (PPE) usage, safe injection practices, and environmental hygiene. The survey will also capture demographic information, years of experience, and previous infection control training received by the participants. Data analysis will involve descriptive statistics, including mean scores and percentages, to assess the overall knowledge level among healthcare workers. Furthermore, the knowledge scores will be compared across different departments and experience levels using appropriate statistical tests. The findings will provide insights into the gaps in knowledge regarding infection control practices among healthcare workers. This information can be utilized to develop targeted educational interventions and training programs to enhance their understanding and adherence to infection control guidelines.

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