

Risk of “On Job Non Compliance” towards Various COVID-19 Standard & Transmission Based Infection Prevention & Control Measures/Precautions among the Healthcare Workers Working in OPD Settings of Public Sector Tertiary Care Hospitals of Quetta Balochistan (Prospective Cohort Study)

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Abstract

Background: COVID-19 Pandemic is still circulating within the human population and proving to be a deadlier disease with a mortality rate ranging from 0.5% to 7%. Since COVID-19 is a highly transmissible disease; there is always a probability for its outward spread towards the general public and community from the hospitals and healthcare facilities where they come to seek treatment. **Methodology:** A prospective cohort study design was used, considering the limited available resources and time—a total of 200 healthcare workers (including doctors, nurses, para-medical staff, janitorial staff, reception staff & pharmacists) working in the OPDs of the two major public sector hospitals

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of Quetta were made part of this study. The study participants were selected using a simple random sampling technique and selection was made from the daily attendance register. The study participants from “Hospital-A” were first of all educated and trained on various COVID-19 IPC measures later on various COVID-19-IEC materials; written in simple Urdu language, were displayed clearly everywhere in the OPD. Similarly, handwashing stations along with hand sanitizers/soaps and surgical face masks were also made available free of cost for all the study participants of Hospital-A. Moreover the importance and effectiveness of COVID-19 IPC measures were continuously announced in the OPD gallery of Hospital-A, these announcements used simple wording in local languages (*i.e.*, Urdu, Pashto, Balochi and Brahvi). On the other hand, in the OPD of “Hospital-B”, no such interventions were made. The study participants of both the hospitals were followed for one month and observations like which group showed more on-job noncompliance towards various COVID-19 IPC measures were recorded. The data was recorded on daily basis (from 1st May-to-31st May 2021) after observing the study participants for compliance towards using face masks, face shields, personal protective gowns, gloves, hand sanitizers, maintaining 6 feet social distancing and implanting triage at his or her OPD counter. Any study participant with daily proper practice of at least face masks, gloves, hand sanitizer and maintaining a 6 feet social distancing SOPs during duty hours at the outdoor patients department was considered to be a compliant individual if even one of these minimum required SOPs has not practiced the study participant, he/she was classified as non-compliant individual. A checklist was used to record these findings for every study participant on daily basis by trained data collectors. Lastly, all the data was analyzed using Microsoft Excel 2007 version. **Results:** The major findings of this study are almost in line with the set objectives, the study results are clearly showing the Risk Ratio (RR) as 0.27, indicating that the intervention group participants were only 27% as likely to develop on-job non-compliance for various COVID-19 IPC measures compare to the non-intervention group. **Discussion & Conclusion:** It is highly recommended that various COVID-19 specific infection prevention and control interventions like COVID-19 IPC trainings, COVID-19 IEC and BCC materials be displayed clearly everywhere in the healthcare facilities especially in the OPD department. Moreover, audio announcements made in simple wording using local languages like Urdu, Pashto, Balochi and Brahvi could really serve as constant reminder tools especially in an OPD department where every next patient in the queue could present with a different infectious bug.

Keywords

COVID-19, IPC Measures, IEC & BCC Materials

1. Introduction

COVID-19 Pandemic is still circulating within the human population and prov-

ing to be a deadlier disease with a mortality rate ranging from 0.5% to 7% [1]. According to the latest global data on the WHO website as of 5:54 pm CEST, 5 July 2021, there have been 183,560,151 confirmed cases of COVID-19, including 3,978,581 deaths so far, as reported by WHO [1]. Due to the lack of resources, surveillance and response structure in various developing countries, including Pakistan, fewer numbers of cases [2] are reported daily.

As of 5 July 2021, a total of 2,988,941,529 vaccine doses have been administered [1]. Considering various factors like: low herd immunity, weak immunization pace, huge population numbers, poverty, illiteracy, weak health infrastructures and no vaccine production and research capabilities, most of the developing countries including Pakistan will continue to remain at risk for COVID-19 outbreaks [3] in the coming future.

The safest and most cost-effective intervention for the developing countries, therefore, remains the adoption of Infection Prevention and Control (IPC) measures [4].

According to WHO's various IPC measures are poorly implemented/adopted in the various healthcare facilities of developing countries as a result, the prevalence of Hospital Acquired Infections (HCAIs) in low- and middle-income countries varies between 5.7% and 19.1%. Similarly, the proportion of patients with infections acquired in intensive care units in low- and middle-income countries ranges from 4.4% to 88.9%, while the incidence of surgical site infections is up to nine times higher than in developed countries [5].

Considering these points, WHO came up with universal practical IPC guidelines for health care facilities in 2014 [5]. These have been later adopted and tailored by the health ministries of several low- and middle-income countries including Pakistan.

2. Literature Review

Most of infection prevention and control measures designed for healthcare facilities are mostly not disease centric in their approach, they are developed mostly by keeping two disease combating components into consideration: 1) Where is the reservoir of the disease causing bug; 2) What is the route of infection of that bug in the human body [5].

Infection prevention and control measures for COVID-19 are classified into two categories: 1) Standard precautions; 2) Transmission base precautions [6]. The standard precautions are mainly researched, designed and developed for the health care workers in mind because they are the most vulnerable group of people who has regular and close contacts with random patients in a hospitalized environment especially during OPD settings [7] [8]

The Standard precautions if adopted properly and regularly will block the entry of SARS-COV2 virus into the body of health care workers [9] [11] [12].

The standard Precautions check the entry points of SARS-COV2 virus which includes nose, mouth and eyes [10]. All the Personal Protective Equipment (PPEs) are basically designed for this purpose hence health care workers are encouraged

to wear face masks which will block the entry of SARS-COV-2 virus droplets & particles through mouth and nose. Goggles for the eyes basically block the entry of suspended SARS-COV-2 particles into the eyes. While face shield gives additional cover over all the entry points of SARS-COV2 virus *i.e.*, it covers all the entry points for the SARS-COV-2 virus which includes eyes, nose and mouth [13] [14]. Other PPEs which includes gown, gloves, head cover and shoe cover are basically protecting the human skin from harboring SARS-COV-2 virus on it; which can live for max of 7 days out of the human body while at minimum its life span is 4 hours [15] [16] [17], hence protecting against Indirect Infection through hands and surfaces if touched while dealing with a patient.

The transmission based precautions for COVID-19 are helps to stop and minimize the COVID-19 transmission in a hospitalized environment; they include adopting triage system, regular hand washing, sanitization and disinfection protocols [18] [19] [20] [21] [22].

So far several Information, Education & Communication (IEC) materials regarding and Behavioral Change Communication (BCC) materials have developed for COVID-19 but their real time effectiveness has not been studied yet.

Operational Definitions:

- On Job:
“During duty hours in the hospital” [23].
- Infection Prevention & Control (IPC) measures:
“Refers to measures/activities intended to curtail infection and their spread in the healthcare facilities” [23].
- Information, Education & Communication (IEC) material:
“Written/printed material in form of charts, brochures & pamphlets containing health education and health promotion knowledge used basically to improve the reader’s knowledge” [23].
- Behavioral Change Communication (BCC) materials:
“Use of communication skills to promote positive health behavior among the people communicated” [23].
- On Job Noncompliance towards Various COVID-19 IPC Measures:
“Refers to not adopting or following the various COVID-19 IPC measures properly or as per protocol or careless in adopting certain IPC measures during duty hours” [23].

Problem Statement:

COVID-19 is a highly transmissible disease; there is always a probability for its out ward spread towards general public and community from the hospitals and other healthcare facilities where patients come to seek treatment.

Rationale:

In developing countries like Pakistan where the prevalence of Hospital Acquired Infections (HCAIs) varies between 5.7% and 19.1% there is always a probability of SARS-COV-2 virus infection. Normally the healthcare facilities in developing countries mostly belong to public sector where large number of patients visit daily to their OPD departments and seek treatments, therefore there is al-

ways a great possibility that these hospitals and healthcare facilities could harbor SARS-COV-2 virus where it could mutate into a new potent stain (bug) that might cause an outward spill of towards the general public.

So far no published literature has assessed on job compliance towards standard and transmission based COVID-19 precautions among the healthcare workers working in a tertiary care hospital of a developing country especially after IEC and BCC interventions.

Objectives:

- To assess the incidence rate of on-job noncompliance of various COVID-19 IPC measures among the two groups (IPC trained group and untrained group) of health care workers working in an OPD setup of a tertiary care hospital.
- To assess the impact of various COVID-19 trainings, IEC and BCC interventions on the attitude of the health care workers.

Methodology:

A prospective cohort study design was used, considering the limited available resources and time—A total of 200 healthcare workers (including doctors, nurses, para-medical staff, janitorial staff, reception staff and pharmacists) working in the OPDs of the two major public sector hospitals of Quetta were made part of this study. The study participants were selected using simple random sampling technique and selection was made from the daily attendance register. The study participants from “Hospital-A” were first of all educated and trained on various COVID-19 IPC measures later on various COVID-19-IEC materials; written in simple Urdu language, were displayed clearly everywhere in the OPD. Similarly, hand washing station along with Hand sanitizers/Soaps and surgical face masks were also made available free of cost for all the study participants of Hospital-A. More over the importance and effectiveness of COVID-19 IPC measures were continuously announced in the OPD gallery of Hospital-A, these announcements used Simple wording in local languages (*i.e.*, Urdu, Pashto, Balochi and Brahvi). On the other hand, in the OPD of “Hospital-B” no such interventions were made. The study participants of both the hospitals were followed for one month and observations like which group showed more on-job noncompliance towards various COVID-19 IPC measures were recorded. The data was recorded on daily basis (From 1st May-to-31st May 2021) after observing the study participants for compliance towards using face masks, face shields, personal protective gown, gloves, hand sanitizers, maintaining 6 feet social distancing and implanting Triage at his or her OPD counter. Any study participant with daily proper practice of at least face masks, gloves, hand sanitizer and maintaining a 6 feet social distancing SOPs during duty hours at Outdoor Patients department was considered to be a Compliant individual if even one of these minimum required SOPs has not practiced the study participant, he/she was classified as non-compliant individual. A checklist was used for recording these findings for every study participant on daily basis by trained data collectors. Lastly, all the data was analyzed using Microsoft Excel 2007 version.

3. Results

Socio-Demographic Characteristics of Respondents:

The major socio-demographic characteristics of the participants are summarized in the following **Table 1**.

Alternate day change in the on job non-compliance attitude towards COVID-19 IPC measures among the healthcare workers of the Hospital-A (the intervention group):

Table 1. Socio-demographic characteristics of respondents.

S.NO	Socio-demographic characteristics of the study participants	Sub-set	Percentages (%)	Frequency (n)
1	Education	Primary	9%	18
		Metric	20%	40
		Intermediate	17%	34
		MBBS/Graduation	3%	06
		Masters	2%	04
		Post graduation/Phd	49%	98
2	Co-morbidities	No comorbidity	90%	180
		DM	2%	04
		Asthma	4%	08
		HTN	2%	04
		Hepatitis	2%	04
		Ovarian CA	0%	00
3	COVID-19 vaccine status	Vaccination no	63%	126
		Vaccination yes	37%	74
4	Hepatitis-B vaccine status	Vaccination yes	93%	186
		Vaccination no	7%	14
5	Seasonal flu vaccine status	Seasonal flu vaccination no	7%	14
		Seasonal flu vaccination yes	93%	186
6	Blood groups of the study participants	A+	7%	14
		A-	4%	08
		B+	27%	54
		B-	3%	06
		AB+	2%	04
		AB-	1%	02
	O+	1%	02	
	O-	1%	02	
	Unkown	54%	108	

On the very next day after the interventions in Hospital-A, it was observed that out of 100 study participants only 40% (n = 40) were found to show full compliance towards all the COVID-19 IPC measures during their duty in the OPD. Post intervention observed on-job Compliance Level towards various COVID-19 IPC measures is shown below (**Table 2**):

Table 2. Post intervention observed on-job compliance level towards various COVID-19 IPC measures (intervention group).

S.NO	Date	Frequency of participants observed showing non compliance towards COVID-19 IPC measures	Alternate day percent change in the non compliance level
1	1-May-21	60	
2	2-May-21		Sunday
3	3-May-21	59	
4	4-May-21	55	-7% ▼
5	5-May-21	55	
6	6-May-21	55	
7	7-May-21	53	-4% ▼
8	8-May-21	52	-2% ▼
9	9-May-21		Sunday
10	10-May-21	50	
11	11-May-21	50	
12	12-May-21	50	
13	13-May-21	49	-2% ▼
14	14-May-21	47	-4% ▼
15	15-May-21	45	-4% ▼
16	16-May-21		Sunday
17	17-May-21	43	
18	18-May-21	43	
19	19-May-21	43	
20	20-May-21	40	-7% ▼
21	21-May-21	40	
22	22-May-21	40	
23	23-May-21		Sunday
24	24-May-21	35	
25	25-May-21	33	-6% ▼
26	26-May-21	32	-3% ▼
27	27-May-21	30	-6% ▼
28	28-May-21	27	-10% ▼
29	29-May-21	27	
30	30-May-21		Sunday
31	31-May-21	25	

Alternate day change in the on job non-compliance attitude towards Covid-19 IPC measures among the healthcare workers of the Hospital-B (the non-intervention group):

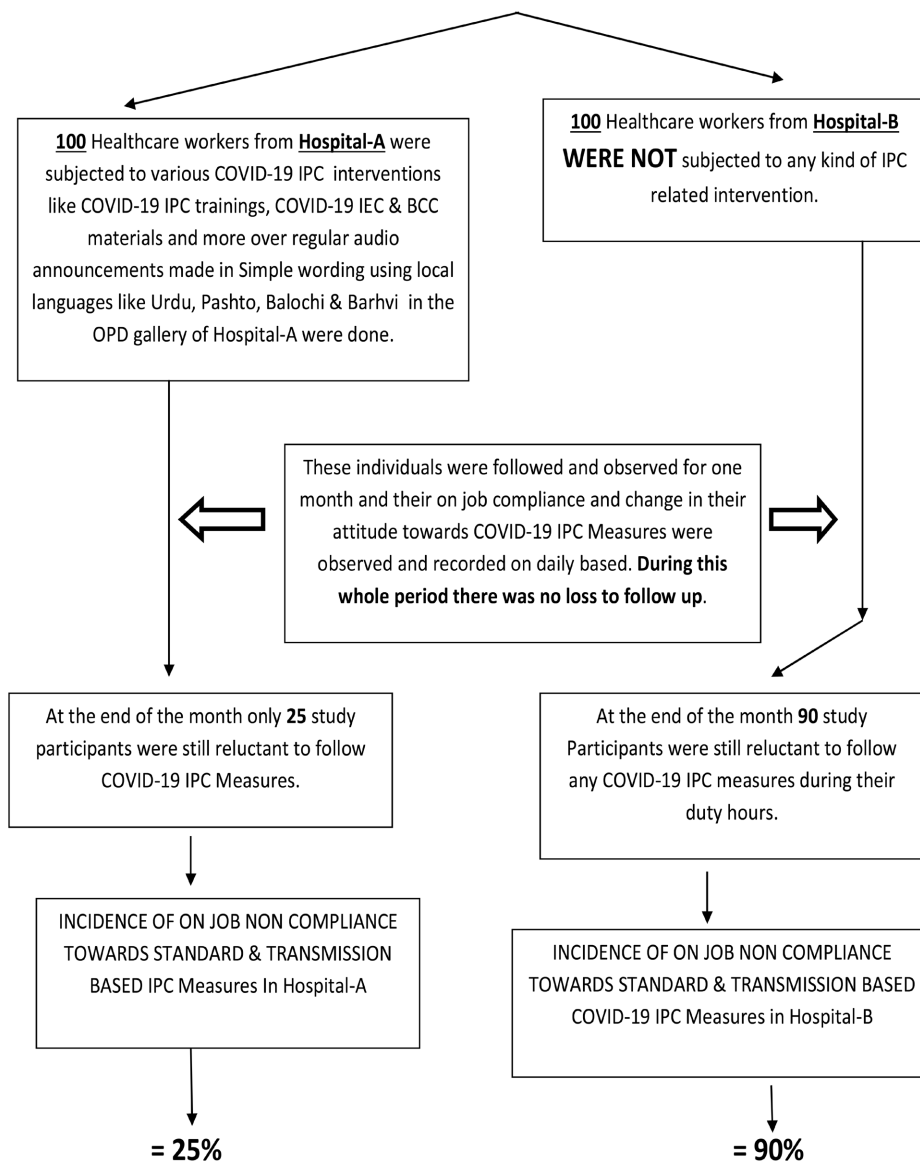
From the very first day of observing non-compliant attitude among the 100 study participants of the Hospital-B (the nonintervention group) were all poorly adopting the various COVID-19 IPC measures as shown below (**Table 3**):

Table 3. Observed on-job Compliance Level towards various COVID-19 IPC measures (non-intervention group).

S.NO	Date	Frequency of participants observed showing non compliance towards COVID-19 IPC measures	Alternate day percent change in the non compliance level
1	1-May-21	89	
2	2-May-21		Sunday
3	3-May-21	92	
4	4-May-21	90	-2% ▼
5	5-May-21	88	-2% ▼
6	6-May-21	86	-2% ▼
7	7-May-21	85	-1% ▼
8	8-May-21	95	12% ▲
9	9-May-21		Sunday
10	10-May-21	92	
11	11-May-21	90	-2% ▼
12	12-May-21	89	-1% ▼
13	13-May-21	87	-2% ▼
14	14-May-21	88	1% ▲
15	15-May-21	91	3% ▲
16	16-May-21		Sunday
17	17-May-21	88	
18	18-May-21	85	-3% ▼
19	19-May-21	83	-2% ▼
20	20-May-21	87	5% ▲
21	21-May-21	88	1% ▲
22	22-May-21	92	5% ▲
23	23-May-21		Sunday
24	24-May-21	91	
25	25-May-21	86	-5% ▼
26	26-May-21	88	2% ▲
27	27-May-21	89	1% ▲
28	28-May-21	98	10% ▲
29	29-May-21	88	-10% ▼
30	30-May-21		Sunday
31	31-May-21	90	

Inferential Statistics:

- **Total Study participants from Hospital-A = 100** (The Intervention Group).
 - **Total Study participants from Hospital-B = 100** (The Non Intervention Group).
- OVER All Study Sample Size Total = 200**



Using the incidence rates for non-compliance in both the groups the Risk Ratio could be calculated as follow:

$$\begin{aligned}
 \text{Risk Ratio (RR)} &= \frac{\text{Incidence of noncompliance among the study participants of Hospital-A}}{\text{Incidence of noncompliance among the study participants of Hospital-B}} \\
 &= 25\% / 90\% \\
 &= 0.27
 \end{aligned}$$

Hence those who were subjected to various COVID-19 IPC trainings and other interventions had 0.27 times the risk for “on job non-compliance towards various COVID-19 standard and transmission based precautions” compare to those

who were not subjected to any intervention.

4. Discussions & Conclusions

The major findings of this study are almost in line with the set objectives, the study results clearly showing that the Risk Ratio (RR) of 0.27, indicate that the intervention group participants were only 27% as likely to develop on-job non-compliance for various COVID-19 IPC measures compare to the non-intervention group. Considering the prevalence of Hospital Acquired Infections (HAIs) in low- and middle-income countries which vary between 5.7% and 19.1% [23], there is always a high probability that these infections including COVID-19 could spill out of the hospitals' environment into the community and also they can infect health-care workers working over there. Hence with low herd immunity, weak immunization pace, huge population numbers, poverty, illiteracy, weak health infrastructures, no vaccine production and research capabilities, most of the developing counties including Pakistan will remain at risk for COVID-19 outbreaks in the future.

The best suggestion and intervention for the developing countries that could at least address the spread of COVID-19 in a cost-effective method at health facility levels remains to be the adoption of various standard and transmission based non-pharmacological measures of Infection Prevention and Control (IPC) [5].

5. Recommendations

It is highly recommended that various COVID-19 specific infection prevention and control interventions like COVID-19 IPC trainings, COVID-19 IEC and BCC materials be displayed clearly everywhere in the healthcare facilities especially in the OPD department. Moreover, audio announcements made in simple wording using local languages like Urdu, Pashto, Balochi and Barhvi could really serve as constant reminder tools especially in an OPD department where every next patient in the queue could present with a different infectious bug.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] WHO (2020) WHO Coronavirus (COVID-19) Dashboard. <https://covid19.who.int>
- [2] Hsiang, S., Allen, D., Annan-Phan, S., *et al.* (2020) The Effect of Large-Scale Anti-Con-

- tagion Policies on the COVID-19 Pandemic. *Nature*, **584**, 262-267. <https://doi.org/10.1038/s41586-020-2404-8>
- [3] Lai, S., Ruktanonchai, N.W., Zhou, L., *et al.* (2020) Effect of Non-Pharmaceutical Interventions to Contain COVID-19 in China. *Nature*, **585**, 410-413. <https://doi.org/10.1038/s41586-020-2293-x>
- [4] Flaxman, S., Mishra, S., Gandy, A., Coupland, H., *et al.* (2020) Estimating the Effects of Non-Pharmaceutical Interventions on COVID-19 in Europe. *Nature*, **584**, 257-261. <https://doi.org/10.1038/s41586-020-2405-7>
- [5] Arons, M.M., Hatfield, K.M., Reddy, S.C., *et al.* (2020) Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. *The New England Journal of Medicine*, **382**, 2081-2090. <https://doi.org/10.1056/NEJMoa2008457>
- [6] Gudbjartsson, D.F., Helgason, A., Jonsson, H., *et al.* (2020) Spread of SARS-CoV-2 in the Icelandic Population. *The New England Journal of Medicine*, **382**, 2302-2315. <https://doi.org/10.1056/NEJMoa2006100>
- [7] McMichael, T.M., Currie, D.W., Clark, S., *et al.* (2020) Epidemiology of Covid-19 in a Long-Term Care Facility in King County, Washington. *The New England Journal of Medicine*, **382**, 2005-2011. <https://doi.org/10.1056/NEJMoa2005412>
- [8] Hamner, L., Dubbel, P., Capron, I., *et al.* (2020) High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice—Skagit County, Washington, March 2020. *Morbidity and Mortality Weekly Report*, **69**, 606-610. <https://doi.org/10.15585/mmwr.mm6919e6>
- [9] Luo, L., Liu, D., Liao, X., *et al.* (2020) Contact Settings and Risk for Transmission in 3410 Close Contacts of Patients with COVID-19 in Guangzhou, China: A Prospective Cohort Study. *Annals of Internal Medicine*, **173**, 879-887. <https://doi.org/10.7326/M20-2671>
- [10] CDC and ICAN (2019) Best Practices for Environmental Cleaning in Healthcare Facilities in Resource-Limited Settings. <https://www.cdc.gov/hai/pdfs/resource-limited/environmental-cleaning-508.pdf>
- [11] Damani, N. (1997) Manual of Infection Control Procedure. Cambridge University Press, Cambridge.
- [12] Damani, N. (2019) Manual of Infection Prevention and Control. Oxford University Press, Oxford. <https://doi.org/10.1093/med/9780198815938.001.0001>
- [13] Department of Health (2016) Health Technical Memorandum 01-01: Management and Decontamination of Surgical Instruments (Medical Devices) Used in Acute Care.
- [14] Donskey, C. *et al.* (2009) The Hands Give It away. *The New England Journal of Medicine*, **360**, e3. <https://doi.org/10.1056/NEJMicm0707259>
- [15] ECDC (2014) Safe Use of Personal Protective Equipment in the Treatment of Infectious Diseases of High Consequence.
- [16] ECDC (2016) Point Prevalence Survey of Healthcare Associated Infections and Antimicrobial Use in European Acute Care Hospitals—Protocol Version 5.3.
- [17] ECDC (2017) Surveillance of Healthcare-Associated Infections and Prevention Indicators in European Intensive Care Units (HAI-Net ICU Protocol). https://ecdc.europa.eu/sites/portal/files/documents/HAI-Net-ICU-protocol-v2.2_0.pdf
- [18] Fisher, E.M. and Shaffer, R.E. (2014) Commentary Considerations for Recommending Extended Use and Limited Reuse of Filtering Face Piece Respirators in Health Care Settings. *Journal of Occupational and Environmental Hygiene*, **11**, D115-D128. <https://doi.org/10.1080/15459624.2014.902954>

- [19] Ford, N. (2015) World Health Organization Guidelines on Post Exposure Prophylaxis for HIV: Recommendations for a Public Health Approach. *Clinical Infectious Diseases*, **60**, S161-S164. <https://doi.org/10.1093/cid/civ068>
- [20] Healing, T.D., Hoffman, P.N. and Young, S.E. (1995) The Infection Hazards of Human Cadavers. *Communicable Disease Report. CDR Review*, **5**, R61-R68.
- [21] Heymann, D.L. (2014) Control of Communicable Disease Manual. 20th Edition, American Public Health Association, Washington DC.
- [22] WHO (2014) Practical Guidelines for IPC in Healthcare Facilities. New Delhi. http://www.wpro.who.int/publications/docs/practical_guidelines_infection_control.pdf
- [23] WHO (2015) Global Action Plan on Antimicrobial Resistance. Geneva. <https://apps.who.int/>