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### RESEARCH ARTICLE

#### KNOWLEDGE AND AWARENESS OF EMERGENCY HEALTH WORKERS AND NURSING STAFF REGARDING RABIES IMMUNISATION

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#### Abstract

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#### Introduction:-

Rabies is exceptionally fatal encephalitis with almost 100% mortality. It is caused by Rhabdo viruses in the Lyssa virus genus. Transmission typically occurs when broken skin is contaminated with saliva from an infected mammal usually in association with a bite but in rare instances by scratches. In spite of rapid and significant improvements across different public health domains rabies continues to be a major public health challenge in most of the developing countries. According to World Health Organization (WHO) estimates rabies is prevalent in more than 150 countries and territories and around 55,000 people die of the infection every year, <sup>1</sup> with India alone accounting for about 20,000 deaths. <sup>2</sup> Majority of the cases of rabies (about 97%) are due to bites from rabid dogs, followed by bites from other animals like the cat, monkey, horse, pigs, and camels. It is well established that immediate post exposure prophylaxis (PEP) measures of wound cleaning and anti-rabies immunization prevent the onset of rabies and death. Various studies in different parts of the world show that knowledge regarding rabies, its modes of transmission and preventive measures is inadequate among health personnel at all levels like field health workers, nursing students, medical students, nursing staffs and even among doctors. In a study from China, of the 711 people who died of rabies, 6.3% were classified as category one, which should have had no risk for rabies, pointing to the fact that knowledge regarding PEP among healthcare staff was not adequate. <sup>3</sup> In a study on dog bite management among medical officers at six dog bite management centres in Pakistan, the researchers expressed a dire need for improved awareness and understanding of dog bite management among health care providers in order to prevent rabies deaths. <sup>4</sup> Studies from third world countries like Tanzania and Turkey have shown a low level of knowledge among health workers regarding zoonotic diseases in general, <sup>5</sup> and rabies in particular. <sup>6</sup> In this regard correct knowledge among health care providers regarding cause and mode of transmission of rabies, classification of contact with rabid animals and their management and dose schedule of rabies vaccine is very important. Health care providers particularly the field health workers play a key role in the immediate management of persons with animal bites, thereby preventing rabies cases. For the general mass they are the first level of contact with health care system and they are also most acceptable and accessible to the public. All this makes it more pertinent that they should have adequate and absolute correct knowledge regarding prevention of rabies. Review of literature shows that there is dearth of studies which reveals the knowledge status of health workers regarding rabies or the impact of their knowledge status following a training programme on rabies. Considering its fatality, any animal bite should be dealt with utmost care. So, it becomes imperative that the health care professionals have appropriate knowledge about the animal bites, risk prevention of Rabies, and be better equipped to tackle this menace more efficiently. Many community studies have been carried out to know the knowledge, attitude and practices of people regarding rabies but studies among health care professionals are very few. Hence the present study has been undertaken to study the knowledge, attitude and practices among general practitioners regarding rabies in India.

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**Objectives of the Study:-**

1. To assess the knowledge regarding the different aspects of rabies.
2. Knowledge regarding the site, routes, and schedule of PEP
3. Knowledge regarding rabies immunoglobulin (RIG) administration in routine and special situations.
4. To provide adequate, appropriate and high quality intervention according to deficiency of knowledge of health workers.

**Review of literature:****Rabies:**

The fatal madness of rabies has been described throughout recorded history, and its association with rabid canines is well known. For centuries, dog bites were treated prophylactically with cautery, with predictable and unfortunate results. In the 19th century, Pasteur developed a vaccine that successfully prevented rabies after inoculation and launched a new era of hope in the management of this uniformly fatal disease.

Rabies is a viral disease that affects the central nervous system (CNS). The genus *Lyssavirus* contains more than 80 viruses. Classic rabies, the focus of this article, is the prototypical human *Lyssavirus* pathogen.

There are 10 viruses in the rabies serogroup, most of which only rarely cause human disease. The genus *Lyssavirus*, rabies serogroup, includes the classic rabies virus, Mokola virus, Duvenhage virus, Obodhiang virus, Kotonkan virus, Rochambeau virus, European bat *Lyssavirus* types 1 and 2, and Australian bat *Lyssavirus*.

The rabies virus is a bullet-shaped virion with a single-stranded ribonucleic acid (RNA) nucleocapsid core and lipoprotein envelope. Its nucleocapsid material consists of Negri bodies, which are observed in the cytoplasm of infected neurons. The virus is transmitted in saliva or in aerosolized secretions from infected animals, typically via a bite. The virus is not hardy and is quickly inactivated by drying, ultraviolet rays, x-rays, trypsin, detergents, and ether.

**Etiology:**

Rabies is a highly neurotropic virus that evades immune surveillance by its sequestration in the nervous system. Upon inoculation, it enters the peripheral nerves. A prolonged incubation follows, the length of which depends on the size of the inoculum and its proximity to the CNS. Amplification occurs until bare nucleocapsids spill into the myoneural junction and enter motor and sensory axons. At this point, prophylactic therapy becomes futile, and rabies can be expected to follow its fatal course, with a mortality rate of 100%.

The rabies virus travels along these axons at a rate of 12-24 mm/d to enter the spinal ganglion. Its multiplication in the ganglion is heralded by the onset of pain or paresthesia at the site of the inoculum, which is the first clinical symptom and a hallmark finding. From here, the rabies virus spreads quickly, at a rate of 200-400 mm/d, into the CNS, and spread is marked by rapidly progressive encephalitis. Thereafter, the virus spreads to the periphery and salivary glands.

From the standpoint of diagnosis and therapeutic opportunities, it is important to understand that rabies does not cause cytotoxicity. Neuronal morphology and lifespan is normal throughout the course of the disease. Death occurs from global neurologic and organ dysfunction. The virion acts in the synaptic space, where homology in amino acid sequences between neurotransmitter receptors for acetylcholine, GABA, and glycine may afford a mechanism for viral binding of these receptors. Thus, its action is neurotoxic, rather than direct damage.

Further, as disease progresses, virus may no longer be viable or replicating in tissue, although Negri bodies are present. If the virus could be contained or the binding action reversed, a cure might indeed be possible.

Rabies, though a disease of low public health priority, still continues to be a major public health problem in India. In humans, rabies is almost invariably fatal once clinical symptoms have developed. WHO reports around 50 000 rabies deaths every year, out of which 20 000 are estimated to occur in India alone. There is often gross under-reporting of human rabies deaths in India. Despite potent anti-rabies vaccines and immunoglobulins available, rabies is far from control and elimination. An effective strategy for control of rabies takes into account the epidemiology of animal bites, rabies and factors influencing post exposure treatment. Hence it becomes pertinent to review the current status of rabies and strategies for its control in the country. In this article, an attempt has been made to

discuss the epidemiology of Rabies, pathogenesis, diagnosis and its prevention and control including the various regimens of anti-rabies vaccines and immunoglobulins available for post-exposure prophylaxis. The importance of primary preventive measures like Animal Birth Control (ABC) and vaccination of dogs has also been highlighted. It is emphasized that rabies should be recognized as priority public health problem and cell culture vaccines should be made available free of cost at all government health facilities. Other important measures include generation of awareness about rabies and first aid of animal bites.

**Bats:**

Bat (avian) rabies appears to be widespread in the 49 continental states, and since 1980, most endemic rabies cases in humans in the United States have been associated with bat strains.<sup>7</sup>

**Raccoons:**

Raccoons have been recognized a reservoir for rabies in the southeastern United States since the 1950s.<sup>8</sup> Currently, the risk of raccoon transmission exists in all of the eastern coastal states and Alabama, Pennsylvania, Vermont, West Virginia, and Ohio.

**Skunks:**

Three areas are associated with skunk-borne rabies: the north-central United States, the south-central United States, and California. As recently as 2001, a new skunk-borne variant arose from a bat strain and has since been quickly spreading.

**Dogs and cats:**

Cats are the most common domestic animals reported by US health departments as being rabid, owing to the high number of unvaccinated strays with possible contacts with bats and other mammals.<sup>9,10</sup>

**Dogs and cats along the Mexican border:**

Limited resources and minimal public health infrastructure in the bordering communities have hindered efforts to maintain animal control through dog-vaccination programs. Viral studies of human cases reported from US Border States implicate an urban canine rabies strain and a link to coyote rabies in southern Texas.<sup>11</sup>

**Lower-risk animal species in the United States:**

Any mammal is potentially at risk for rabies, some more than others. Lower-risk animal species in the United States include dogs, cats, and ferrets in areas not near a border. No person in the United States has ever contracted rabies from a dog, cat, or ferret held in quarantine for 10 days. American opossums are especially at low risk, because the species' low body temperature hinders replication.

**Animal rabies vaccine:**

The vaccinia-rabies glycoprotein virus used in rabies vaccine-laden baits for wild animals is a self-replicating agent. This oral animal vaccine may cause adverse effects in some humans exposed to it through animal bites, particularly in hosts with altered immunocompetence and persons in whom smallpox vaccination is contraindicated (eg, pregnant women, patients with an exfoliative skin condition).<sup>12</sup>

**Transplantation patients:**

The innate state of immunosuppression in this population often provides a favorable environment for viral replication. Recipients of neurally derived tissues are at highest risk; however, any tissue poses a risk. In 2004, kidneys and liver were inadvertently transplanted from a donor from Texas with rabies that had gone undiagnosed; the recipients developed clinical rabies within 30 days, resulting in 100% mortality.<sup>13</sup>

**International:**

Rabies is more prevalent in the developing world than in industrialized countries. The World Health Organization (WHO) estimates that rabies is responsible for 35,000-50,000 deaths annually worldwide and that gross underreporting is likely. An estimated 10 million people receive postexposure prophylaxis each year after being exposed to animals with suspected rabies. Unvaccinated dogs are the major reservoir for rabies.

**Global reservoirs of rabies virus are as follows<sup>14,15</sup>:**

Europe - Foxes, bats

Middle East - Wolves, dogs  
Asia - Dogs  
Africa - Dogs, mongooses, antelopes  
North America - Foxes, skunks, raccoons, insectivorous bats  
South America - Dogs, vampire bats  
Sex-related demographics

Encounters with rabid animal vectors may be increased in males, who may have greater contact in certain geographic areas. Evidence to support this is found in data on dog bites, which are observed more frequently in males than in females.

**Pathophysiology:**

Rabies virus infection is remarkable for the lack of evident pathology in the face of dramatic neurological symptoms. Minimal inflammation and neuronal cytopathy may be observed even postmortem. Similarly, viremia does not occur or play a role in spread to the CNS.

Pathophysiology has been best characterized in canine rabies variants. Canine rabies in humans requires deep-muscle inoculation. Endogenous muscle micro-RNA bind to viral transcripts and limit both replication and viral protein production, such that the virus is able to evade detection by antigen-presenting cells. Once enough virus replicates (or with a high-level inoculum or direct nerve injury), it binds motor neuron junctions at postsynaptic nicotinic acetylcholine receptors, which initiates uptake into the motor endplate. From here, the virus rapidly propagates across motor axons and chemical synapses in retrograde fashion toward the ganglia and nerve roots, at which point the prodromal symptoms of neuralgia and hypoesthesia may begin, in addition to fever and flulike illness.

Once reaching the CNS, it spreads throughout via the more ubiquitous nicotinic acetylcholine receptors of the brain. Of note, anterograde spread of rabies virus may then occur via sensory and autonomic pathways from the CNS to viscera, explaining many of the symptoms of progressive disease. Throughout propagation of the virus along motor pathways, the virus elicits little inflammation, and the motor neurons continue their otherwise normal functions of neurotransmission. Increasing signs of inflammation develop as CNS and visceral spread occurs, although a significant paucity of findings remains, other than mild nonspecific MRI T2 enhancements. Spinal fluid remains largely acellular, even in the presence of detectable rabies virus.

Propagation to the CNS via peripheral sensory or autonomic synapses does not seem to occur with canine variants, and only about 30% of cases result in peripheral sensory neuralgia. However, 70% of cases with bat variants result in neuropathic pain in the region of inoculation, as well as Horner syndrome and other findings; thus, these alternate pathways may occur in bat rabies variants.<sup>16, 17</sup>

**Rabies Treatment & Management:****Approach Considerations:**

When the patient presents with a bite, the wound should be cleansed immediately with soap and water, flushing it thoroughly to remove saliva. Debridement and careful exploration for foreign body (eg, broken tooth) are essential; this should take at least 10 minutes. Generally, leave wounds to heal by secondary intention to permit drainage of wound fluids and prevent infection.<sup>18, 19</sup>

**Inpatient care:**

Inpatient care of patients with rabies may be needed if wounds are extensive or are on the face and hands, if surgical repair or replacement of blood loss is required, or if infection occurs.

**Transfer:**

For a patient with an illness consistent with rabies, transfer to a tertiary care center with intensive care support and capability of providing timely diagnostic workup is essential.

**Follow-up:**

Coordinate follow-up evaluations of patients with the primary caregiver, the local health department, and, if applicable, the veterinarian who quarantined the animal.

**Pre exposure Prophylaxis or Immunization:**

Preexposure, active prophylaxis or immunization is recommended for veterinarians, veterinary students, persons who regularly explore or hike in caves, laboratory workers who are exposed to rabies virus or who handle specimens considered high risk for rabies, and persons who visit countries where rabies is a significant problem (ie, visits >30 d).

CDC and WHO recommend 2 doses of cell-culture vaccine administered intramuscularly or intradermally on days 0 and 3 for preexposure "booster" prophylaxis.<sup>15</sup>

Booster immunization is indicated for individuals at continuous or frequent risk of rabies, who should undergo periodic rabies antibody testing and who have serum rabies titer of less than 1:5 dilution based on RFFIT results.

An NAb titer greater than or equal to 0.5 IU/mL (or complete neutralization at a serum dilution of 1:5) is considered an acceptable antibody response for protection against rabies.

Passive immunization consists of the administration of human rabies immunoglobulin (HRIG) pooled from the sera of immunized human donors.

**Post exposure Approach to Animal Bites and other Exposures:**

As previously stated, washing and wound debridement at the time of a bite is essential, along with careful cleaning of the wound for longer than 10 minutes. Generally, leave wounds to heal by secondary intention.<sup>18, 19</sup> Antibiotic prophylaxis should be considered.<sup>19, 20</sup>

Administer HRIG to any person not previously vaccinated against rabies, at a dose of 20 IU/kg (for adults and children). Apply as much of the dose as possible at the injury site and the remainder as a deep IM injection in the gluteal area. HRIG may be administered as long as 7 days after the first dose of vaccine if it is not immediately available when the patient presents for evaluation.<sup>9, 18</sup>

Equine rabies immunoglobulin may be available in other countries. Minimal adverse effects occur if it is in the purified form. If unpurified, however it may cause serum sickness and anaphylaxis.

Two different inactivated rabies vaccines are licensed and produced, as follows:

Human diploid cell vaccine (HDCV; Imovax) - Usual dosing for postexposure prophylaxis to be administered as IM injection

Purified chick embryo cell vaccine (PCEC; RabAvert) - Licensed in the United States in 1997 for IM use only

Doses of all the vaccines for postexposure prophylaxis are 1 mL IM in the deltoid or in the upper outer thigh in infants.

Mild local and systemic adverse reactions to these vaccines and immunoglobulin may occur but are usually treatable with supportive care, antihistamines, and anti-inflammatory medications. Local pain, erythema, headache, nausea, and abdominal pain may occur. If prophylaxis is warranted, do not postpone or discontinue treatment because of mild adverse effects.

**Postexposure Prophylaxis or Immunization before Symptom Onset:**

Before the onset of rabies symptoms, optimal results require immediate, vigorous wound cleansing; passive immunization with immunoglobulin; and active immunization with rabies vaccine.<sup>15</sup> Children are prone to extensive wounds on the face, upper body, and hands because of their short stature.<sup>21</sup> These wounds may require extensive debridement and inpatient management.

Do not administer immunoglobulin and vaccine with the same syringe or in the same site. Do not administer vaccine in the gluteus, as antibody response may be reduced.

Passive immunoglobulin provides protection for 1-2 weeks until the vaccine elicits protective antibody.

If the patient has had no prior rabies vaccination, if he or she is of unknown status, or if more than 5 years have passed since his or her last vaccination, rabies vaccine and immunoglobulin should be administered as follows (these dosages being applicable to products available in the United States):

Rabies vaccine IM (deltoid) - 1 mL on days on days 0, 3, 7, and 14 (if immunocompromised, add an additional dose: 1 mL IM deltoid on days 0, 3, 7, 14, and 28)

Rabies immunoglobulin - 20 IU/kg infiltrated as much as feasible around and under the bite wound; if any left over, give IM (gluteus)

The pediatric dose of HRIG, calculated by body weight, may be of insufficient volume to infiltrate all of the wounds. The immunoglobulin may be diluted with sterile saline so that more volume can be used without exceeding the total recommended dose.<sup>22</sup>

If the patient has had prior rabies vaccination, rabies vaccine should be administered IM (deltoid) 1 mL on days 0 and 3 (this dosage again being applicable to US vaccine).

The World Health Organization (WHO) has revised PEP guidance for previously unimmunized individuals in order to reduce cost and spare vaccine doses without reducing effectiveness. Currently recommended guidance for rabies PEP outside the United States, in order of preference, includes the following:<sup>15</sup>

Two-site intradermal (ID) vaccine administration on days 0, 3, and 7

One-site IM vaccine administration on days 0, 3, 7 and the fourth dose between days 14 and 28 (same as in the United States)

Two-site IM vaccine administration on day 0 and one-site IM administration on days 7 and 21

Prophylaxis may be discontinued if the animal does not develop rabies within 10 days or is found to be free of rabies upon sacrifice.

The median duration of rabies illness in dogs, cats, and ferrets is less than 10 days, and viral shedding in saliva occurs within a few days of onset of illness and death.

Because of the exceedingly low prevalence of rabies in domestic animals in the United States, healthy, unvaccinated domestic dogs, cats, and ferrets are often observed for 10 days for signs of illness. If the animal remains healthy, no treatment is administered.

Note that an assessment of whether a bite was provoked is subjective and does not significantly affect the chances that the animal is rabid. Therefore, this is not helpful in determining the need for prophylactic treatment.

Pregnancy is not a contraindication to postexposure prophylaxis against rabies, which is warranted to protect the life of the fetus and mother. No adverse pregnancy outcomes have been documented with postexposure prophylaxis. No mother-to-fetus transmission has been described, and spread of the virus is not hematogenous; thus, neither rabies exposure nor diagnosis in the mother is an indication for pregnancy termination.<sup>23, 24</sup>

WHO recommends ID regimens for use when IM vaccine is unavailable or its use is not feasible.

In previously vaccinated individuals, studies have shown that single-visit, 4-site ID booster regimens offer satisfactory anamnestic response. Advantages of the single-visit booster also included reduced time and reduced costs from loss of work or from delayed travel, along with enhanced compliance.

**Deterrence and Prevention:****In the community:**

The need for adherence to local public health recommendations regarding the control and vaccination of domestic animals and the vaccination of individuals who may be exposed to rabies in their occupation cannot be stressed enough.

Counsel patients regarding the subjective nature of provocative behavior toward animals. Especially stress avoiding contact with unfamiliar or wild animals.

Prompt, vigorous cleansing of any injury or bite from any animal is critical and may reduce the risk of rabies transmission. Provide extensive reassurance after any injury that may be related to rabies transmission. Fear of rabies is primal and is known to induce hysterical reactions that mimic the disease manifestations.

Promote educational efforts at home and at schools teaching children about safety procedures and precautions regarding pets and wild animals. Many communities have programs through camps, schools, and public libraries, as well as information through local health department Web sites.<sup>25</sup> Veterinarians and public health officials are excellent resources for concerns regarding animal rabies prevention.<sup>9,26</sup>

**In addition, the public should be advised to do the following:**

1. Teach children at an early age not to handle stray animals or wildlife, especially bats found on the ground
2. Report any animals that are sick or acting strange to local public health authorities
3. Consult public health authorities if a bat is seen in the home at night, even if a bite is not suspected
4. Have professional animal trappers remove bat colonies from homes and barns
5. Handle sick or dead animals with heavy gloves and shovels
6. Wash hands with soap and water after contact with wildlife
7. If an animal scratch or bite occurs, especially if due to a bat, fox, raccoon, skunk, or unvaccinated dog or cat, (1) immediately wash the areas vigorously with soap and water and (2) immediately seek care at an emergency department. Aside from rabies, bites may become infected, and preventive care is available if sought.

For patient education information, see the Infections Center, as well as Rabies.

**Healthcare workers:**

Universal precautions and respiratory precautions during respiratory therapy are indicated for health care providers.

**Control of rabies in the animal population:**

Because rabies is a zoonosis, primary prevention requires control of rabies in the animal population. Mass control and mandatory vaccination of domesticated dogs and cats are effective in controlling rabies.

**Medication Summary:**

Before the onset of rabies symptoms, passive and active immunizations are effective in preventing progression to full-blown rabies.

If the patient has had no prior rabies vaccination, if he or she is of unknown status, rabies vaccine and immunoglobulin should be administered as follows (these dosages being applicable to products available in the United States):

Rabies vaccine IM (deltoid) - 1 mL on days on days 0, 3, 7, and 14 (if immunocompromised, add an additional dose: 1 mL IM deltoid on days 0, 3, 7, 14, and 28)

Rabies immunoglobulin - 20 IU/kg infiltrated as much as feasible around and under the bite wound; if any left over, give IM (gluteus)

If the patient has had prior rabies vaccination, vaccine should be administered as follows (this dosage again being applicable to US vaccine): Rabies vaccine IM (deltoid) 1 mL on days on days 0 and 3.

Chowdhury R et al<sup>27</sup> (2013) found that animal bite management and rabies immunization among interns of a government medical college in Kolkata. Rabies is a zoonotic disease, transmitted by animal bites, mainly dogs.

About 99% of all human deaths from rabies occur in the developing nations. It is invariably fatal if proper treatment is not instituted promptly. One of the important factors associated with successful treatment is the knowledge of the care giver in the proper management of animal bites and rabies vaccination. To assess among the interns of R.G. Kar Medical College, Kolkata: The knowledge of animal bite wound management. • The knowledge of rabies pre and post-exposure prophylaxis (PEP). A predesigned and pretested anonymous questionnaire with structured questions on animal bite and pre-and PEP was distributed among the interns of R.G. Kar Medical College in the month of March 2012. Among the total of 80 interns, 56.3% and 72.6% of interns did not categorize bites into single transdermal bite and licks on broken skin as Cat-III wound. 12.5% of interns were aware of the intradermal route of vaccination. Ten percent of interns could correctly describe the PEP management of Cat-I wounds while 31.2% of interns thought it was necessary to add rabies immunoglobulin in Cat-II wounds. The results of the study reveal that there are significant gaps in the knowledge regarding the management of animal bite injuries and immunisation.

Jain P et al<sup>28</sup> (2014) found that during 15th September 2013 to 15th December 2013 at the community health centre (CHC), Muradnagar, distt Ghaziabad, among the victims of dog/animal bite attending the daily OPD services of CHC. To identify the level of general awareness and knowledge of wound management and rabies among the cases of dog bite and to study the awareness of people about antirabies vaccines and health service utilization. The study population composed of 250 victims of dog or animal bite, Patients were selected and approached after proper briefing, with well-prepared two page structured questionnaire designed in local language to assess their knowledge about the wound management, information about the epidemiology of dog bite. The result of the study reflect the very low level of awareness about the postdog bite management of wounds as well as about the disease rabies group of people questioned and also reveals serious gaps in understanding of wound severity, classification and correct application of PEP with ARV vaccine and RIG. There is definitely a gap in people's knowledge, attitude, and practices about dog bite and its management and there is need of taking serious measures for the control of stray dog population at the block level.

Kapoor P et al<sup>29</sup> (2019) found that being a fatal and 100% preventable disease, all efforts must be made by the health system to prevent even a single case of rabies. By assessing the knowledge of people regarding rabies prevention, they can make plans and policies for its prevention. The aim of this study was to assess the knowledge regarding rabies among attendees of anti-rabies clinic of a teaching hospital, Jaipur. This observational cross-sectional study was conducted among attendees of anti-rabies clinic, Govt. R.D.B.P. Jaipuria hospital, Jaipur from February 2018 to July 2018. A total of 107 participants were included in the study. Data was collected using preformed questionnaire. Continuous data were expressed in mean and standard deviation and count data were expressed in proportion. In their study population, only 22.5% respondents had good knowledge, 56% had fair, and 21.5% had poor knowledge. Fatality of rabies was known to 68.2% of participants. One fourth of the participants knew that rabies is not curable, however, approximately 83% knew that it is preventable. Fifty-six percent of the participants were aware about washing the bite wound with soap and water. Approximately one-third (36%) of the participants knew that it is an infectious disease, however, only 7.5% knew that saliva, vomitus, tear, and urine of rabies patient may have rabies virus. Approximately 15% of the attendees had a wrong concept that a single injection is sufficient for immunization. Although this study was done at a teaching hospital, lack of knowledge is still a big issue in urban population as well. This study concludes that knowledge regarding rabies should be highlighted in national programs of India to acknowledge Indian population regarding fatal rabies.

Glasgow L et al<sup>30</sup> (2019) found that while Grenada attained a zero-human-rabies case status since 1970, the authors conducted the first study to assess knowledge, attitudes, and practices that may contribute to this status as well as to receive feedback on the rabies control program in Grenada. A cross-sectional survey was conducted in July, 2017 with 996 households on the mainland. A questionnaire was administered to collect information on knowledge of rabies and prevention, vaccination practices, perception of institutional responsibilities for rabies control, and evaluation of the anti-rabies program. Of the 996 households, 617 (62%) had owners of animals that can be infected with rabies and were included in the analysis. Respondents were very aware of rabies as a disease that can infect animals and humans. The rate of participation in the vaccination program was 51.6% for pets and 38.0% for livestock. About 40% of respondents were knowledgeable about the extent of protection from the rabies vaccine. Respondents did not demonstrate exceptionally high levels of knowledge about animals that were likely to be infected with rabies, neither the anti-rabies programs that were conducted in Grenada. The three most frequent recommendations made to improve the rabies-control programs were: increase education programs, control the mongoose population, and expand the vaccination period each year. Conducting a comprehensive national rabies



education program, expanding the vaccination program, and increasing the rate of animal vaccination are important steps that need to be taken to maintain the current zero-human-case status.

Bailey JL et al<sup>31</sup> (2018) found that rabies is an important neglected disease, which kills around 59,000 people a year. Over a third of these deaths are in children less than 15 years of age. Almost all human rabies deaths in Africa and Asia are due to bites from infected dogs. Despite the high efficacy of current rabies vaccines, awareness about rabies preventive healthcare is often low in endemic areas. It is therefore common for educational initiatives to be conducted in conjunction with other rabies control activities such as mass dog vaccination, however there are few examples where the efficacy of education activities has been assessed. Here, primary school children in Zomba, Malawi, were given a lesson on rabies biology and preventive healthcare. Subsequently, a mass dog vaccination programme was delivered in the same region. Knowledge and attitudes towards rabies were assessed by a questionnaire before the lesson, immediately after the lesson and 9 weeks later to assess the impact the lesson had on school children's knowledge and attitudes. This assessment was also undertaken in children who were exposed to the mass dog vaccination programme but did not receive the lesson. Knowledge of rabies and how to be safe around dogs increased following the lesson (both  $p < 0.001$ ), and knowledge remained higher than baseline 9 weeks after the lesson (both  $p < 0.001$ ). Knowledge of rabies and how to be safe around dogs was greater amongst school children who had received the lesson compared to school children who had not received the lesson, but had been exposed to a rabies vaccination campaign in their community (both  $p < 0.001$ ) indicating that the lesson itself was critical in improving knowledge. In summary, they have shown that a short, focused classroom-based lesson on rabies can improve short and medium-term rabies knowledge and attitudes of Malawian schoolchildren.

Holla R et al<sup>32</sup> (2017) found that rabies, a 100% fatal disease claims more than 59,000 human lives every year globally. One human life is lost every 15 minutes due to this deadly preventable disease. Timely initiation of post exposure prophylaxis following an animal exposure can result in 100% preventability of this fatal disease. This facility based study was conducted among clinical fraternities of teaching hospitals. A semi structured questionnaire was used for collection of data. Institutional Ethics Committee approval was sought. The study investigators visited the workplace of the participants and distributed the questionnaire. SPSS Ver 16 (Chicago, IL, USA) was used to analyse the data. Most of the participants knew that veterinary groups and zoo-keepers should be given pre-exposure prophylaxis. Many participants knew about the Intra Muscular schedule of anti-rabies vaccine and its site of administration for pre exposure prophylaxis. It was observed that most participants had knowledge regarding correct intramuscular regimen of anti-rabies vaccine for post-exposure prophylaxis but less than half were able to differentiate between the intramuscular and intradermal regimens. Less than half of participants were aware of the fact that local administration of anti-rabies serum is useful. The knowledge regarding WHO categorisation of animal exposure and recommended post exposure prophylaxis according to type of exposure observed to be minimal among clinical fraternity.

Singh A et al<sup>33</sup> (2013) found that many myths and false beliefs associated with wound management. These include application of oils, herbs, and red chilies on wound inflicted by rabid animals, and not washing the wound properly. General practitioners (GPs) constitute a key source of medical care in study area and are approached for anti-rabies treatment by victims of animal bites. The aim of the present study is to assess the knowledge and practices among the general practitioners (GPs) regarding dog bite management. Community-based cross-sectional study. The present study was carried out in the private and public clinics of Ambala city from January 2012 to April 2012 using a pre-tested self-administered questionnaire. The study population composed of 100 GPs comprising 45 MBBS or above degree holders (Group 1) and 55 other GPs like BAMS, RMPs, etc (Group 2). Interpretation of data was done using percentages and proportions.  $\chi^2$  -Test was used to test the statistical difference in the knowledge between the two groups. Out of the total, 68% and 29% respondents in Group 1 and Group 2, respectively, correctly told that wound must be washed with soap and water for minimum period of 15 min. A total 71% and 11% respondents in Group 1 and Group 2, respectively, could correctly answer about the target groups for pre-exposure prophylaxis. A total 62% GPs did not know the high-risk groups to whom pre-exposure prophylaxis has to be given. There was an apparent lack of awareness among the GPs regarding appropriate animal wound management and vaccine administration. Reorientation programs and continued medical education for GPs are required to highlight the WHO guidelines regarding treatment of animal bite.

Tiwari A et al<sup>34</sup> (2018) found that rabies is a fatal viral zoonotic disease. In India about 20,000 persons die of rabies annually. The aim of present study was to assess the knowledge regarding rabies and its prevention among the medical students. A cross-sectional study was conducted among 183 medical students of Government Medical

College Rajnandgaon, Chhattisgarh during August 2017 to September 2017 using a pre-tested questionnaire. Data was entered and analyzed by using descriptive statistics (frequency and percentage). It was seen that majority (83.1%) of medical students knew about the viral cause of rabies, 93.4% knew the dog as most common reservoir of rabies and 91.8% knew the most common mode of rabies transmission by bites of rabid animal. About three fourth (74.3%) of medical students knew that hydrophobia as the symptom of rabies in human. About danger sites of animal bite and fatality of rabies was known by 81.4% and 68.8% of medical students, respectively. Only 45.9% of medical students knew the correct incubation period of rabies. Majority (72.7%) of students knew about the immediate wash of the wound with soap and water but only 42.1% knew about antiseptic use. Majority (71%) of students knew the correct site and only 43.7% knew the correct schedule of vaccination. Only 29% of medical students knew about indication of rabies immunoglobulin. There is a need to organize re-orientation programs and continuing medical education (CME) sessions on rabies and its prevention for medical students, at regular interval.

Praveen G et al<sup>35</sup> (2014) found that rabies continues to be major public health problem in India in spite of the wide availability of anti rabies vaccine. In India 20,000 dies of rabies annually. The large number of deaths due to rabies can be attributed to people not aware of the various aspects of the disease and its prevention. To assess the knowledge and perception among first year medical college students. This study was a descriptive study conducted at Hassan Institute of Medical Sciences, Hassan using a pretested questionnaire. A total of 90 first year medical college students participated in this study. 80 (88.8%) knew that rabies is caused by virus. 38(42.2%) knew annual mortality due to rabies in India. 88 (97.7%) knew that rabies is transmitted through bites of an animal. 54 (60%) students knew that rabies is 100% fatal. 44 (48%) students knew the symptoms of rabies. 60 (66.6%) felt that the bites wounds should be washed. 55 (61.1%) knew that an antiseptic to be applied to the wound. 40 (44.4%) students told animal bite wound should not be sutured or bandaged. 15 (16.6%) students knew that 5 doses of vaccine should be taken when bitten by animal. Only 2 (2.2%) were aware of RIGs. Majority of the MBBS students of the first year knew that rabies is caused by virus which is transmitted through dog bite. More than 50% of the students knew about symptoms and post exposure measures correctly. Students had poor knowledge about the other modes of transmission, animal that can transmit rabies, Rabies immunoglobulin and number of vaccine doses. The knowledge regarding rabies prevention among male and female students is same.

Ross RS et al<sup>36</sup> (2006) found that every year, millions of people travel to countries where rabies is enzootic. However, the quality of rabies- specific information provided by travel health advisors and the extent of their knowledge about pre- and postexposure prophylaxis have not been examined on a large- scale basis up to now. 5,780 German health workers and pharmacists, who identified themselves as active travel health advisors, were chosen from a database. The selected providers were asked to complete an Internet- based questionnaire. The form requested both demographic information and the assessment of different concrete scenarios, each of which featured individuals seeking pretravel advice on rabies or appropriate postexposure treatment after returning from abroad. Overall, 496 health workers and pharmacists completed the questionnaire. Almost all respondents indicated that they would mention the risk of rabies and appropriate preventive measures to long- term travelers and tourists planning to visit rural areas. However, only 35% to 60% of the advisors would provide this information to individuals on business trips, package tours, or travelers in urban centers as well. The assessment of the scenarios yielded 51% to 98% of adequate advice. Potentially harmful decisions included, for instance, the failure to recommend further prophylactic measures after exposure of already vaccinated people or the fact that the necessary postexposure prophylaxis was inappropriately withheld in cases where treatment had been initially delayed. Although the participants of this study were well aware of the travel- associated rabies risks and provided adequate information about this health hazard to most of their clients, evident flaws exist regarding the correct assessment of specific situations in pre- and postexposure rabies prophylaxis. Their findings therefore provide important cues on topics that should be more intensely covered during future postgraduate training in travel medicine and also underline the need for more practically orientated, readily available information on specific prophylactic treatment against rabies.

Tiwari HK et al<sup>37</sup> (2018) found that the lack of awareness regarding rabies amongst rural primary care health staff and their adverse practices towards the management of dog-bite wounds is a major contributor to the high incidence of rabies infection and subsequent human mortality in India. A Knowledge, Attitudes and Practices survey was carried out involving 54 nursing and non-nursing staff working in 18 rural Primary Health centres and sub-centres around Baramati town of Pune district in Western India. Multivariable logistic regression models were constructed to assess factors that influenced knowledge of rabies and practices towards management of dog-bite related wounds. The more experienced and better-educated workers were found to have a good awareness of rabies (OR 3.4, 95%CI 1.0–12.1) and good practices towards dog-bite wound management (OR 5.6, 95%CI 1.2–27.0). Surprisingly, non-

nursing staff were significantly more knowledgeable about rabies (OR 3.5, 95%CI 1.0–12.3), but their practices towards dog-bite wound management were inadequate (OR 0.18, 95%CI 0.04–0.8) compared to the nursing staff. It is recommended that a mandatory training module for primary care health staff be developed and implemented to improve their knowledge regarding rabies and management of dog-bite wounds to reduce the incidence of human rabies in rural India.

Chopra D et al <sup>38</sup> (2017) found that people have very basic knowledge about rabies and its prevention. Health workers are usually the first ones to come in contact with a victim of animal bite. “What is the awareness and practices about rabies and animal bite in the Health workers/paramedical staff?” Objectives of the study were 1) assessment of the awareness of staff Nurses about rabies and animal bite management; 2) to study the practices of staff nurses after an animal bite and 3) to find association of socio-demographic factors with the knowledge level. Observational cross sectional conducted at Integral Hospital, IIMSR among 256 staff nurses (response rate 95%) between January 2017 to February 2017. Purposive Convenience Sampling method was used. Data recording by interview on a questionnaire. A scoring pattern was described. The current study observed that the knowledge and awareness of the study subjects on the rabies/ animal bite was variable, high in some aspects and low/poor in others. Majority of the subjects had poor grading of knowledge. Sex, marital status and religion were statistically significantly associated with the knowledge gradient. There is a need for generating awareness about rabies and animal bite. Recommendations: There is a need for sensitization of health workers so that their knowledge can be enhanced and can be translated into proper practices.

Kishore S et al <sup>39</sup> (2015) found that rabies is a deadly disease in which first aid and immuno-prophylaxis after animal bite play a vital role in prevention. Animal bites are usually more prevalent in rural areas and the first aid is sought most commonly from health workers in rural areas. The same is the case in Uttarakhand due to vast expanse of forests and rural area. In the present study, the knowledge, attitude and practices regarding prevention of this disease among a special group of people, i.e. health workers were assessed. District Dehradun was selected as study area and all the health workers in the district (162 health workers, males and females both) were enumerated and interviewed. The data were collected by administering semi structured questionnaire to them. The knowledge was assessed by evolving a scoring system. Practices and attitudes were assessed based on their past experiences and their present willingness for proper management of a case of animal bite. Most of the study participants (59.9%) obtained a medium score (10-17) in knowledge regarding disease and its prevention. All of the participants had heard of the disease and knew about mode of spread. Most of the participants (83.3%) lack knowledge about anti-rabies immunoglobulin and pre-exposure prophylaxis (80.2%). Most of the participants (81.4%) had attitude scores in satisfactory range (2-3). Sixty percent had practice scores in low range (0-2). Though the knowledge regarding pet vaccination and full course of human vaccination was lacking in some, but the willingness to encourage pet owners to vaccinate their pets and encourage bite victims to get full course of vaccine was 100%. There is a need for sensitization of health workers so that their knowledge can be enhanced and their positive attitude (100% willingness) can be translated into proper practices for prevention and control of Rabies.

Shankaraiah RH et al <sup>40</sup> (2013) found that animal bites in humans are an important public health problem. Timely and correct postexposure prophylaxis for victims is necessary to prevent deaths. They studied the knowledge, attitude, and actual practice of rabies prophylaxis among health workers at animal bite clinics and the relationship between their knowledge and actual practice. A cross sectional study was conducted among 109 health workers working in eight Indian cities. The data collected were analyzed using SPSS version 16.0. The descriptive statistics computed. Spearman’s rank correlation was computed to measure the relationship between knowledge, attitude and practice. The knowledge, attitude and practice of this anti rabies and the appropriate life-saving use of immunoglobulins were inadequate. The present study also showed that there was a significant difference between knowledge, attitude, and practice. Knowledge, attitude, and practice needs to be improved through properly designed awareness programmes for all health workers dealing with rabies exposures. Emphasis should be on following current WHO guidelines for post exposure prophylaxis of rabies.

Kumar D et al <sup>41</sup> (2014) found that rabies still continues to be a public health problem in India and to protect our citizens from this menace; medical professionals have to be well equipped to tackle it more efficiently. The paper aims to assess the knowledge of residents and faculty in newly established AIIMS regarding risk prevention of rabies. A cross sectional study using a structured questionnaire on rabies was done at AIIMS Jodhpur amongst the doctors and the data was compiled in Microsoft excel 2010 were further analysed using SPSS version 21. Out of the total sixty respondents, faculty constituted 38.3%, and junior residents and senior residents 28.3% and 33.3%

respectively. Nearly 72% responded correctly regarding post exposure prophylaxis (PEP) i.e. 5 dose regimen of intramuscular administration of Anti Rabies Vaccine (ARV) and 56.7% doctors were unaware about the current recommendation of intradermal (ID) route. Rabies immunoglobulin (RIG) or Anti-Rabies Serum (ARS) against Rabies infection used in Class III bites was known to only 45% of the total doctors. The study reveals that there is a scope of improvement in important areas related to the knowledge of doctors in AIIMS regarding animal bites which needs to be upgraded time to time through continuing medical education in order to follow the standard protocol and guidelines at the apex institute.

Malhotra V et al<sup>42</sup> (2018) found that approximately 36% of the world's rabies deaths occur in India, three-fourth of them in rural areas. Out-of-pocket expenses and lack of transportation from rural areas prevent many of the poorest people in India from accessing primary health-care services, leaving them to carry the burden of rabies. Rabies incidence in India has been constant for a decade, without any obvious declining trend, this situation is due to general lack of awareness of preventive measures, which includes insufficient dog vaccination, an uncontrolled canine population, poor knowledge of proper post-exposure prophylaxis on the part of many medical professionals, and an irregular supply of antirabies vaccine and immunoglobulin, particularly in primary-health-care facilities. The present study was done to assess the skill and knowledge about animal bite management among primary health care providers health-care providers at peripheral health institutes of district Patiala. A cross-sectional survey was done using pretested and validated, self-administered questionnaire. Overall awareness was assessed based on sum score of each outcome according to blooms cutoff point,  $P < 0.05$  was considered statistically significant. Out of 103 government doctors, rural medical officers (RMOs) constitute 32 (31%) and Punjab civil medical services (PCMS) 71 (69%). RMO Cadre has more mean age ( $34.06 \pm 3.95$ ), than PCMS ( $29.02 \pm 5.98$ ). Both cadres have many gaps in their knowledge. Median score of both groups is 13. Almost 45% have low knowledge-practice (K-P) score and the difference in K-P score of RMOs and PCMS are not statistically significant. Both groups lack knowledge on how to manage common clinical scenarios frequently seen in rural areas. There is urgent need for upgrading the knowledge and skills of doctors working at the peripheral health facilities. State health department must coordinate with medical colleges for training by organizing continued medical education for the success of national rabies control programme.

Kotnis SD et al<sup>43</sup> (2017) found that rabies is endemic in many Asian and African Countries, including India. Correct management of animal bite cases by all practicing health workers will help India to be Rabies free country. A cross sectional survey using convenient sampling with snow ball method. The study period was from 1st July 2011 to 31<sup>st</sup> October. The registered private practitioners from various regions in the city were selected for study. Their permission obtained orally. Data collection was done using pre-tested questionnaire by interview method. 97% Allopathic doctors and 94.73% AYUSH doctors had correct knowledge about the agent of Rabies. Only 68.54% of Allopathic and 43.42% of AYUSH doctors knew modes of transmission. Important clinical symptoms were told by 66.93% of Allopathic and 35.52% of AYUSH doctors. 63.7% of allopathic, 39.47% AYUSH doctors were having knowledge about available vaccines. Only 49.19% allopathic and 11.84% AYUSH doctors told Vaccination schedule 71.77% allopathic and 22.36% AYUSH doctors knew about wound washing with soap and water for 15 minutes

Grill AK et al<sup>44</sup> (2009) found that the role of primary care health workers, in conjunction with local public health units, in the management of suspected rabies exposures and to outline the current guidelines for the administration of rabies postexposure prophylaxis. Published guidelines on the topic of rabies were reviewed and additional articles were identified from key references. Various public health websites were also explored. Most evidence was level II or III. Primary care health workers must always consider the risk of rabies when treating patients who have had animal-to-human exposures (eg, bite, scratch), and if indicated, postexposure prophylaxis must be administered as soon as possible because the infection is fatal once clinical symptoms develop. Human cases of rabies are almost entirely preventable if suspected exposures are identified and managed promptly and properly. Primary care health workers must continue to work together with local public health officials in order to minimize the threat of this deadly virus.

Hwang GS et al<sup>45</sup> (2019) found that rabies is a fatal disease that mandates proper prophylaxis after a rabies virus exposure to prevent death. This study evaluated adherence to Centers of Disease Control and Prevention (CDC) recommendations for rabies immune globulin (IG) patient selection, dosing, timing of administration, and anatomical site of administration for rabies postexposure prophylaxis. This retrospective, cross-sectional study included patients who received at least one dose of rabies IG or rabies vaccine at a multi-hospital health system from

January 2015 through June 2018. This study included 246 patients, and all of them received at least one dose of rabies vaccine. Two patients had a history of rabies vaccination, did not have an indication for rabies IG, and appropriately did not receive additional rabies IG. Rabies IG was administered to 91% (223 of 244) of patients with an indication. Of 223 patients who received rabies IG, 219 (98%) received doses within 10% of 20 IU/kg of body weight, and all 223 (100%) received rabies IG within 7 days of the first rabies vaccine administration. Only 56% (96 of 170) of patients with a wound that could be infiltrated with rabies IG actually received rabies IG via infiltration into and around the wound. This multi-hospital health system study demonstrated high adherence to guideline recommendations for rabies IG patient selection (91%), dosing (98%), and timing (100%). However, only 56% of eligible patients received rabies IG infiltration at wound sites as recommended by guidelines.

Nayak RK et al <sup>46</sup> (2013) found that rabies in humans is highly fatal and ends in an extremely painful and tortuous death. Unfortunately they still have highest number of deaths due to rabies, ironically a disease preventable by modern prophylactic measures. The post-exposure prophylaxis is a life saving treatment in a definite rabid animal bite. General Practitioners (GP's) act as first line care-givers for the treatment of dog bite and they are also easily approachable by the victim for the treatment to prevent rabies. To assess the knowledge, attitude and practices regarding rabies among general practitioners. This cross sectional survey was carried out from July – August 2011 in Belgaum city among 100 general practitioners using a pre tested questionnaire. Data was entered and analyzed using SPSS 18 trial version. Frequencies were tabulated for demographic variables and association between variables was tested using Chi-square test. Out of the total 100 general practitioners interviewed, 93 were males and 7 were females. The mean age of GP's was 42.89 years. The mean duration of practice for MBBS doctors was 19 years and for other doctors (BAMS, BHMS, RMP's) was 11 years. Knowledge about various aspects of rabies was comparatively better among MBBS doctors. The knowledge regarding vaccine was very poor among the general practitioners. The major issue was lack of hands on training or updating the knowledge of general practitioners regarding the newer vaccines and their administration. They recommend continued medical education for general practitioners, both (MBBS and non MBBS) on prevention of Rabies.

## **Materials and Methods:-**

### **Study setting:**

The study was conducted among the health workers and nursing staff of Emergency Department of Peerless Hospital. The Peerless hospital Emergency Department is a tertiary level teaching Emergency Department with annual attendance of approx rabies patients of approx 100/year. The expected duration of the study was approximately 1 ½ year between May 2018 to August 2019

### **Study Design:**

The author proposes to conduct a prospective, cross sectional study. After obtaining the institutional ethical committee clearance. A questionnaire designed to elicit their knowledge regarding the animal bite (Rabies). The questionnaire included the questions regarding the symptoms, classification rabies bite, wound management and about the anti-rabies vaccination. The questionnaire is semi structured with prior pilot study being done. Written informed consent was taken from the subjects prior to the study. Onetime assessment was done as it's a cross sectional study design to know their level of knowledge. The responses were noted, coded and entered in an excel sheet and analyzed accordingly. The results which were obtained were expressed in terms of percentages and proportions.

### **Inclusion Criteria:**

The following was included in the study:

All consultants working in the department of emergency medicine.

All Registrar working in emergency department.

All Residents of department of emergency medicine.

All medical officers working in the emergency department.

All nursing staff working in the department of emergency medicine.

### **Exclusion Criteria:**

All those who was not give consent for taking part in the study

**Study Population:**

It is important for the researcher to identify the population from which the data can be collected. Population can be number of units from which data can be potentially collected (Parahoo 1997). For the purpose of this thesis, the data was collected from the consultants, residents, medical officers and nursing staff working in the department of emergency medicine.

**Study Sample:**

A sample plan is an important feature of a qualitative research. According to Parahoo (1997) one of the crucial task in designing a research project is to decide on the number and characteristics of the respondent who was invited to take part in the study.

According to Polit & Hunger (2001) in quantitative research the larger the sample the more representative of the population it is likely to be. For the purpose of this proposal, data was collected, from all participants fulfilling the inclusion criteria. The expected sample size that was recruited for this study is 300

**Study Protocol:**

The study was prospective cross sectional questioner based study and questioner was distributed among the subjects included in the inclusion criteria and then was analysed by the stastician and then was formulated accordingly.

**Data Analysis:**

Upon completion of data collection, data was coded, captured on Excel and then the statistical analysis was done. Descriptive statistics were used to summarize the data and provide answers to the research objectives.

**Ethical Statement:**

A written explanation of the nature of the study was given to the participants. Participants can make an informed decision whether to enter into the study, by the informed consent form (APPENDIX: III). No names were attached to the date collection form or VAS, which was allowed for participant anonymity. Confidentiality of data gathered from participants was respected at all times. This research proposal was submitted to the Research Ethics Committee of Peerless Hospital & B. K. Research Center, Kolkata for scrutiny and approval is granted.

**Statistical Analysis:**

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 25.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables.

Z-test (Standard Normal Deviate) was used to test the significant difference of proportions.

p-value  $\leq 0.05$  was considered for statistically significant.

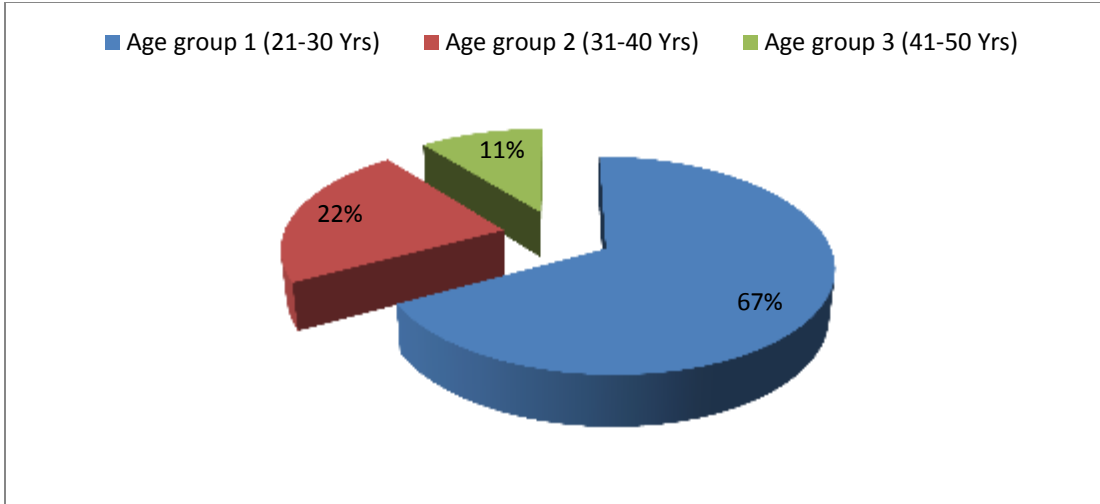
**Result and Analysis:-**

**Table:-** Distribution of Age group.

Age group	Frequency	Percent
Age group 1 (21-30 Yrs)	201	67.0%
Age group 2 (31-40 Yrs)	67	22.3%
Age group 3 (41-50 Yrs)	32	10.7%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

201(67.0%) emergency health workers were under age group 1 (21-30 Years), 67(22.3%) emergency health workers were under age group 2 (31-40 Years) and 32(10.7%) emergency health workers was under age group 3 (41-50 Years).

The value of z is 10.9257. The value of p is  $< .00001$ . The result is significant at  $p < .05$ .

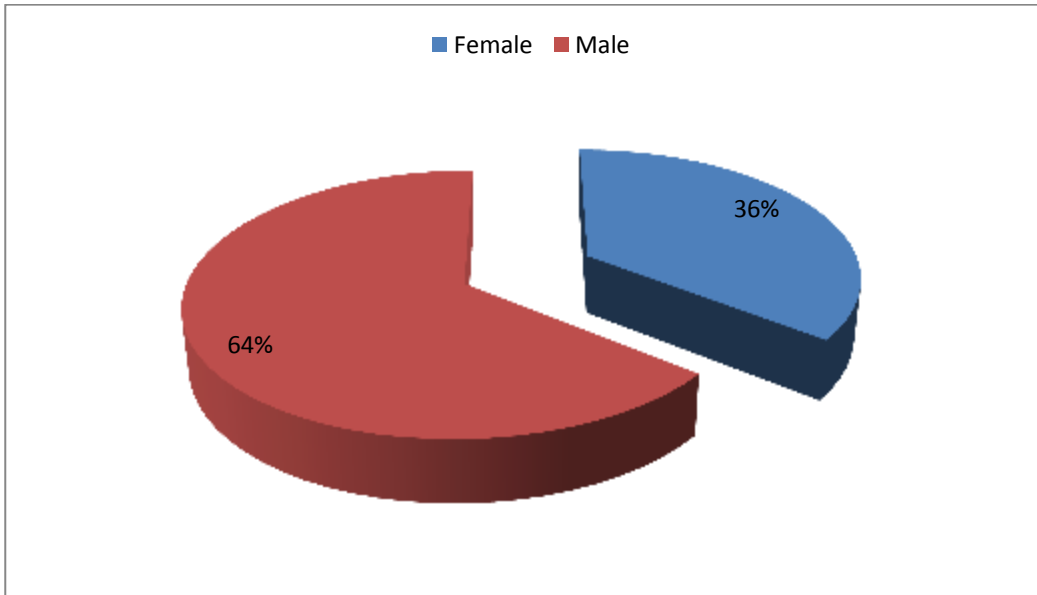


**Table:-** Deistribution of Gender.

Gender	Frequency	Percent
Female	107	35.7%
Male	193	64.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

107(35.7%) emergency health workers were female and 193(64.3%) emergency health workers were male.

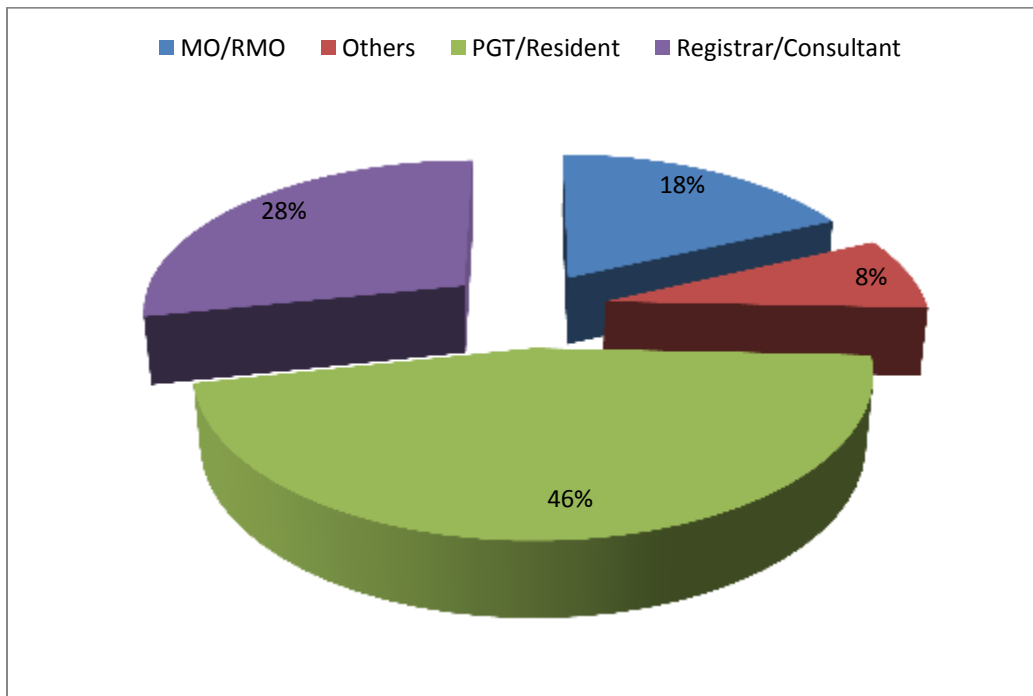
The value of z is 7.0219. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of best describes your present position.

Best describes your present position	Frequency	Percent
MO/RMO	54	18.0%
Others	23	7.7%
PGT/Resident	138	46.0%
Registrar/Consultant	85	28.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

54 (18.0%) emergency health workers were MO/RMO, 23(7.7%) emergency health workers were Others , 138 (46.0%) patient were PGT/Resident and 85(28.3%) emergency health workers were Registrar/Consultant . The value of z is 4.4774. The value of p is < .00001. The result is significant at p < .05.



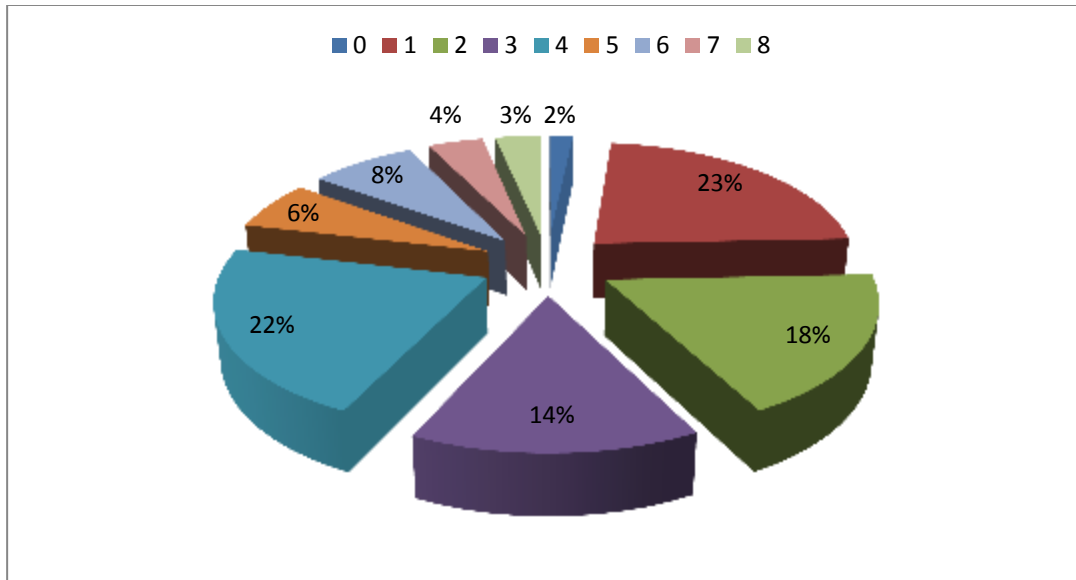
**Table:-** Distribution of Year of Work Experience.

Year of Work Experience	Frequency	Percent
0	5	1.7%
1	68	22.7%
2	54	18.0%
3	44	14.7%
4	65	21.7%
5	19	6.3%
6	23	7.7%
7	12	4.0%
8	10	3.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

5(1.7%) emergency health workers had 0, 68(22.7%) emergency health workers had 1, 54 (18.0%) patient had 2,44(14.7%) emergency health workers had 3, 65(21.7%) emergency health workers had 4, 19(6.3%) emergency health workers had 5,23(7.7%) emergency health workers had 6, 12(4.0%) emergency health workers had 7 and 10(3.3%) emergency health workers had 8.

The value of z is 0.2949. The value of p is .77182. The result is not significant at p < .05.



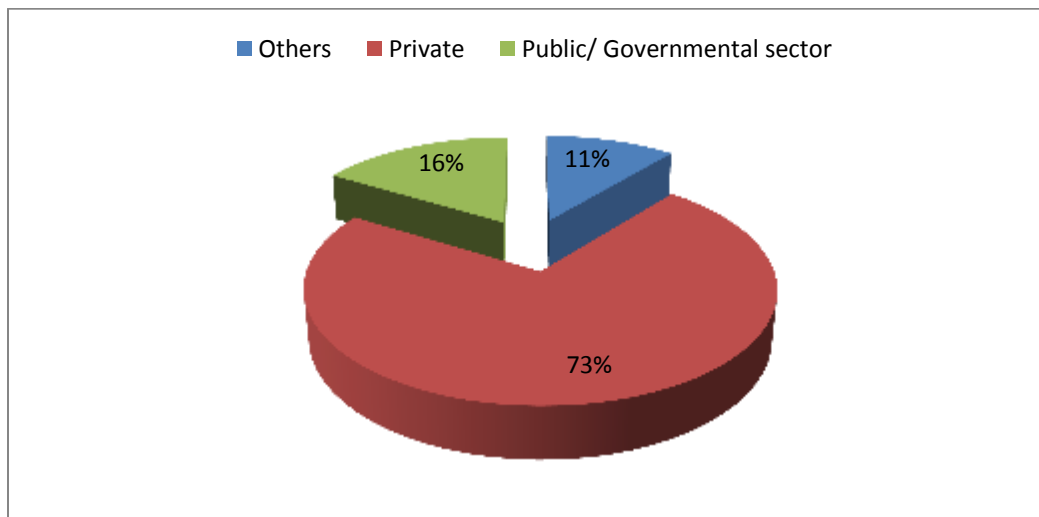


**Table:-** Distribution of category of employment sectors.

Category of employment sectors	Frequency	Percent
Others	33	11.0%
Private	218	72.7%
Public/ Governmental sector	49	16.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

33(11.0%) emergency health workers were Others, 218(72.7%) emergency health workers were Private, and 49(16.3%) emergency health workers were Public/ Governmental sector.

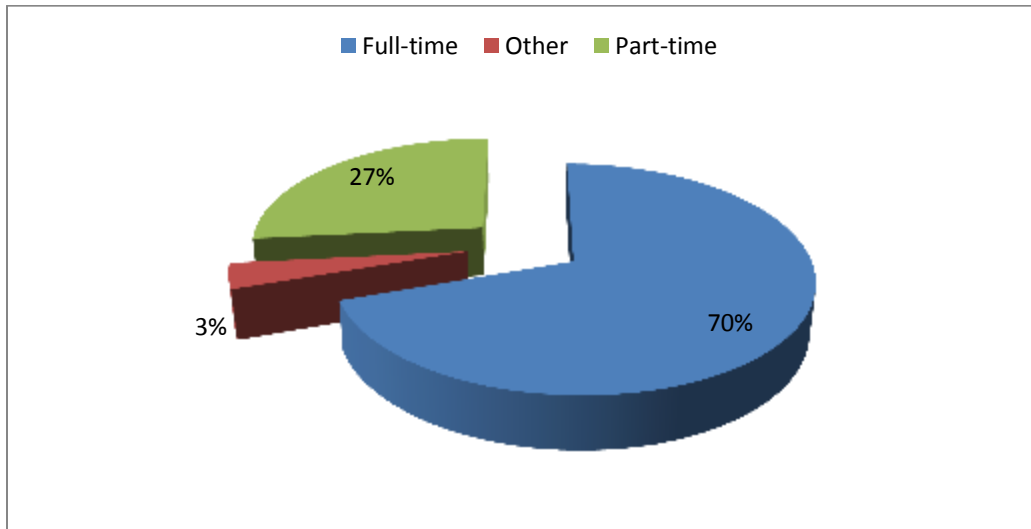
The value of z is 13.883. The value of p is < .00001. The result is significant at p < .05



**Table:-** Distribution of Do you work.

Do you work	Frequency	Percent
Full-time	209	69.7%
Other	11	3.7%
Part-time	80	26.7%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

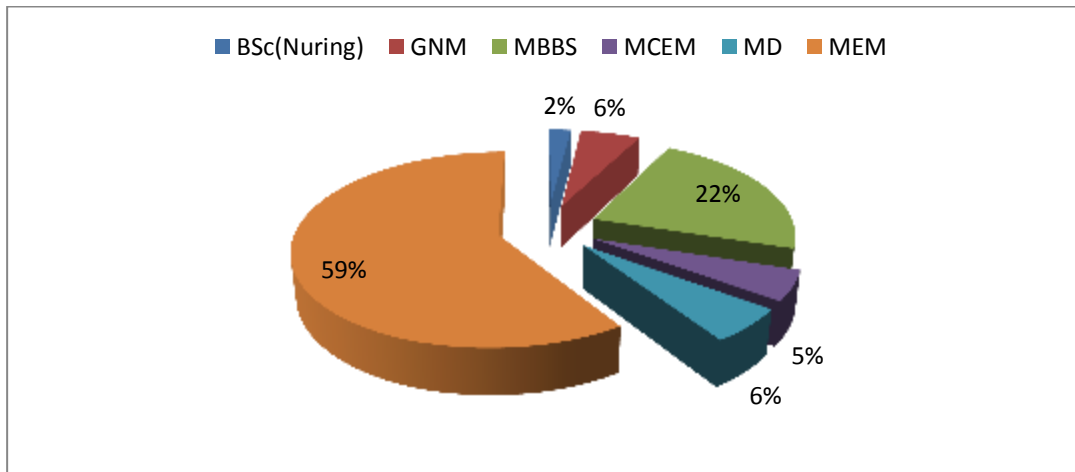
209(69.7%) emergency health workers were Full-time workers, 11(3.7%) emergency health workers were Other workers, and 80(26.7%) emergency health workers were Part-time workers. The value of z is 10.5399. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of Qualifications.

Qualifications	Frequency	Percent
B Sc (Nursing)	6	2.0%
GNM	17	5.7%
MBBS	67	22.3%
MCEM	15	5.0%
MD	17	5.7%
MEM	178	59.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

6(2.0%) emergency health workers were B Sc(Nursing), 17(5.7%) emergency health workers were GNM, 67(22.3%) emergency health workers were MBBS, 15 (5.0%) emergency health workers were MCEM, 17 (5.7%) emergency health workers were MD and 178 (59.3%) emergency health workers were MEM. The value of z is 9.2194. The value of p is < .00001. The result is significant at p < .05.

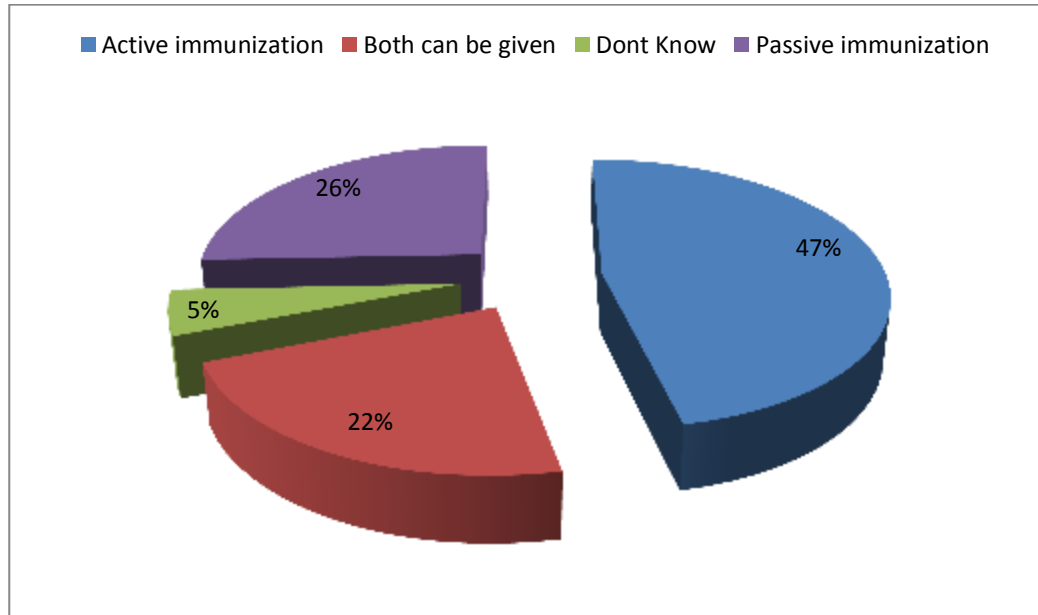


**Table:-** Distribution of rabid bites.

	Frequency	Percent
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<b>Rabid bites</b>		
<b>Active immunization</b>	140	46.7%
<b>Both can be given</b>	67	22.3%
<b>Dont Know</b>	16	5.3%
<b>Passive immunization</b>	77	25.7%
<b>Total</b>	300	100.0%

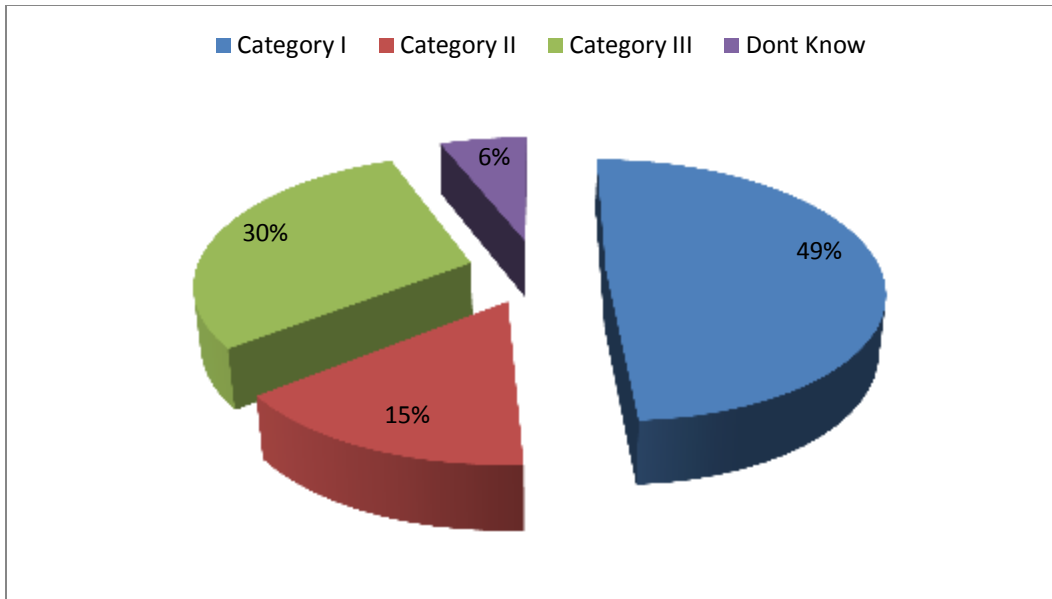
140(46.7%) emergency health workers were Active immunization, 67(22.3%) emergency health workers were Both can be given and 77 (25.7%) emergency health workers were Passive immunization. The value of z is 5.3529. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of WHO category.

<b>WHO category</b>	<b>Frequency</b>	<b>Percent</b>
<b>Category I</b>	147	49.0%
<b>Category II</b>	46	15.3%
<b>Category III</b>	89	29.7%
<b>Dont Know</b>	18	6.0%
<b>Total</b>	300	100.0%

147(49.0%) emergency health workers were Category I, 46(15.3%) emergency health workers were Category II and 89(29.7%) emergency health workers were Category III. The value of z is 4.8473. The value of p is < .00001. The result is significant at p < .05.

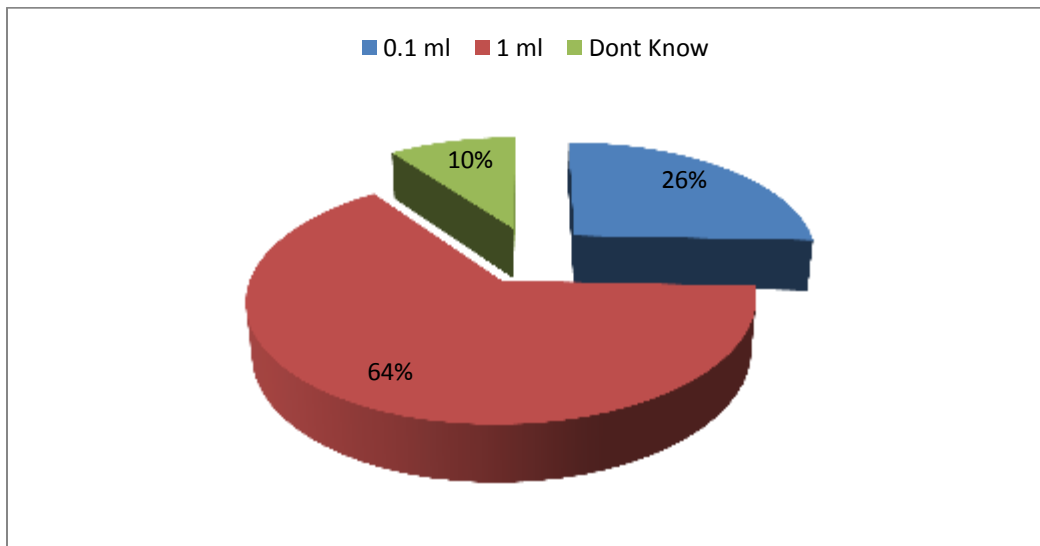


**Table:-** Distribution of Intramuscular dose of ARV.

Intramuscular dose of ARV	Frequency	Percent
0.1 ml	77	25.7%
1 ml	193	64.3%
Dont Know	30	10.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

77(25.7%) emergency health workers had 0.1 ml Intramuscular dose and 193(64.3%) emergency health workers had 1 ml Intramuscular dose.

The value of z is 9.5191. The value of p is < .00001. The result is significant at p < .05.



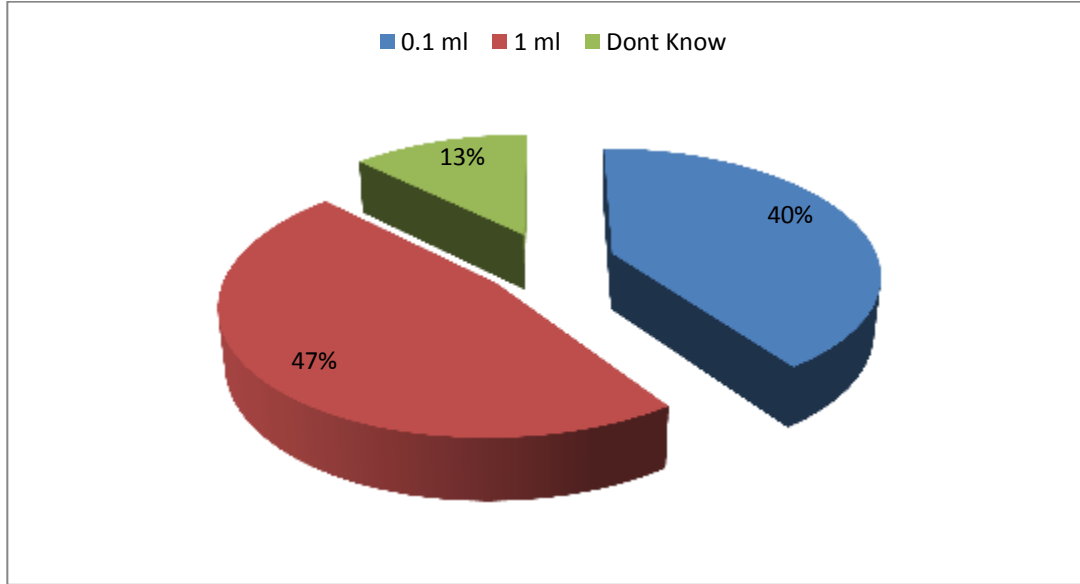
**Table:-** Distribution of Intra dermal dose of ARV.

Intra dermal dose of ARV	Frequency	Percent
0.1 ml	121	40.3%
1 ml	141	47.0%
Dont Know	38	12.7%

<b>Total</b>	300	100.0%
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121(40.3%) emergency health workers had 0.1 ml dose of ARV and 141(47.0%) emergency health workers had 1 ml dose of ARV.

The value of z is 1.6463. The value of p is .09894. The result is not significant at  $p < .05$ .

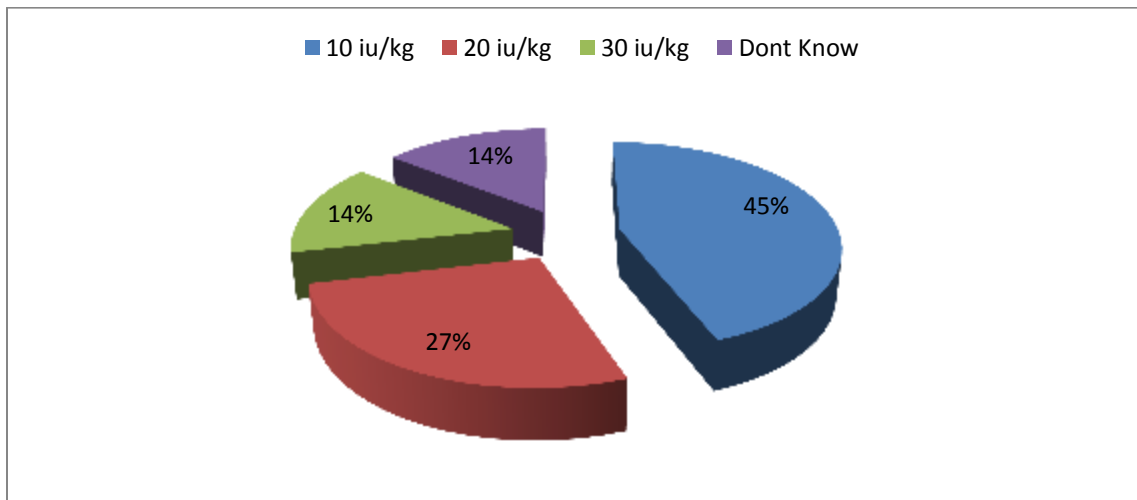


**Table:-** Distribution of dose of ERIG.

Dose of ERIG	Frequency	Percent
10 iu/kg	133	44.3%
20 iu/kg	81	27.0%
30 iu/kg	43	14.3%
Dont Know	43	14.3%
<b>Total</b>	300	100.0%

133(44.3%) emergency health workers had 10 iu/kg dose of ERIG, 81(27.0%) emergency health workers had 20 iu/kg dose of ERIG and 43(14.3%) emergency health workers had 30 iu/kg dose of ERIG.

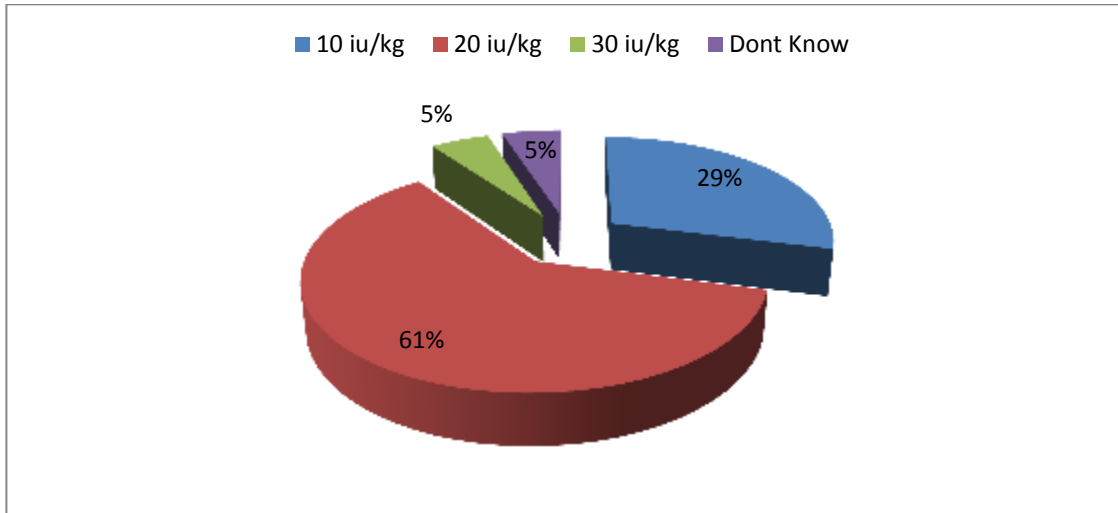
The value of z is 4.4318. The value of p is  $< .00001$ . The result is significant at  $p < .05$ .



**Table:-** Distribution of Dose of HRIG.

Dose of HRIG	Frequency	Percent
10 iu/kg	87	29.0%
20 iu/kg	183	61.0%
30 iu/kg	15	5.0%
Dont Know	15	5.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

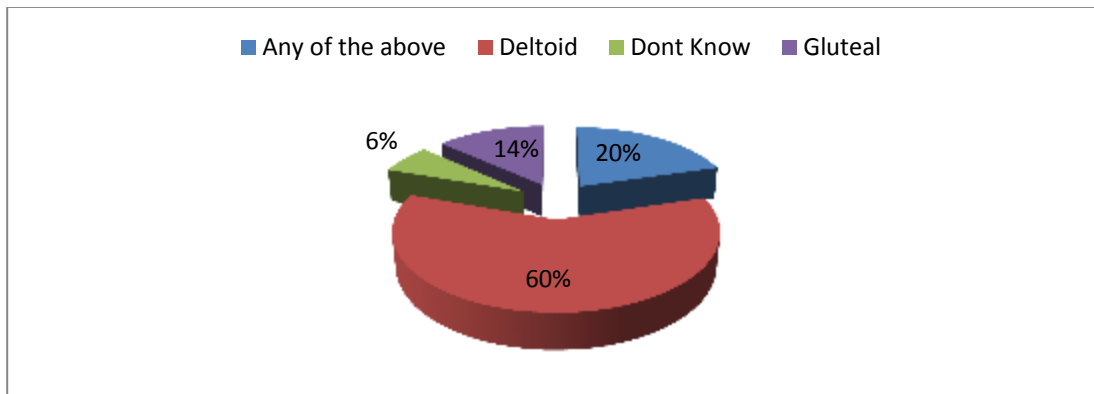
87(29.0%) emergency health workers had 10 iu/kg dose of HRIG, 183(61.0%) emergency health workers had 20 iu/kg dose of HRIG and 15(5.0%) emergency health workers had 30 iu/kg dose of HRIG. The value of z is 7.8779. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of administration of ARV

Administration of ARV	Frequency	Percent
Any of the above	61	20.3%
Deltoid	180	60.0%
Dont Know	19	6.3%
Gluteal	40	13.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

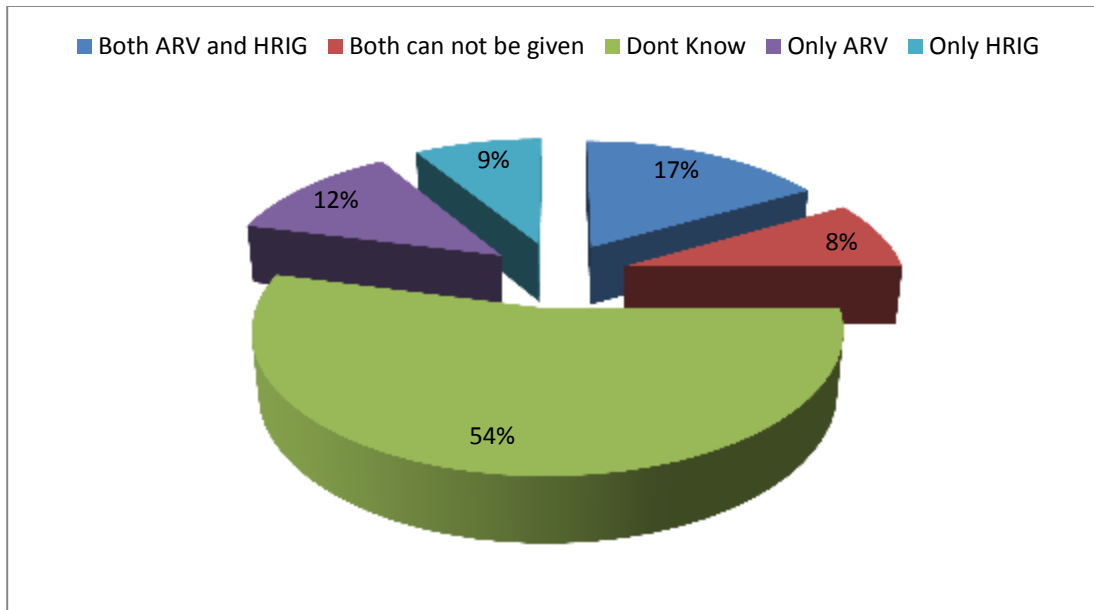
61(20.3%) emergency health workers were any of the above administration of ARV, 180(60.0%) emergency health workers were deltoid administration of ARV, and 40(13.3%) emergency health workers were gluteal administration of ARV. The value of z is 9.9098. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of All are true except.

All are true except	Frequency	Percent
Both ARV and HRIG	50	16.7%
Both can not be given	25	8.3%
Dont Know	162	54.0%
Only ARV	37	12.3%
Only HRIG	26	8.7%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

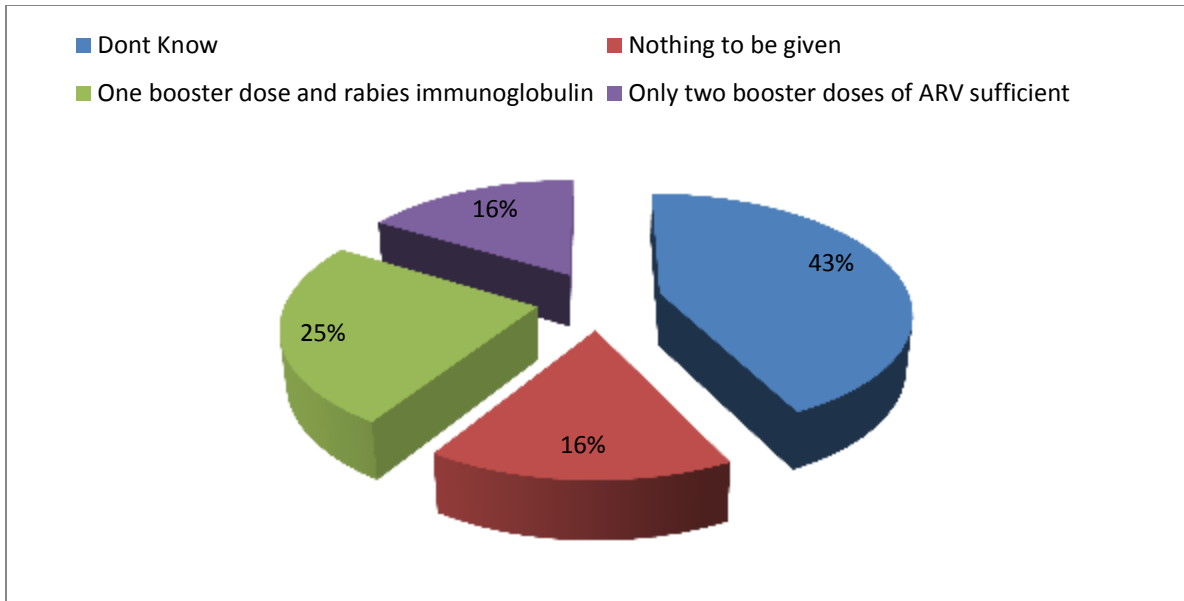
50(16.7%) emergency health workers were both ARV and HRIG, 25(8.3%) emergency health workers were both can not be given, 162(54.0%) emergency health workers were answered dont Know, 37(12.3%) emergency health workers were only ARV and 26(8.7%) emergency health workers were only HRIG. The value of z is 9.5655. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of Pre-exposure prophylaxis.

Pre-exposure prophylaxis	Frequency	Percent
Dont Know	128	42.7%
Nothing to be given	49	16.3%
One booster dose and rabies immunoglobulin	74	24.7%
Only two booster doses of ARV sufficient	49	16.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

128(42.7%) emergency health workers were answered dont Know, 49(16.3%) emergency health workers were answered nothing to be given, 74(24.7%) emergency health workers were one booster dose and rabies immunoglobulin, and 49(16.3%) emergency health workers were only two booster doses of ARV sufficient. The value of z is 4.665. The value of p is < .00001. The result is significant at p < .05.

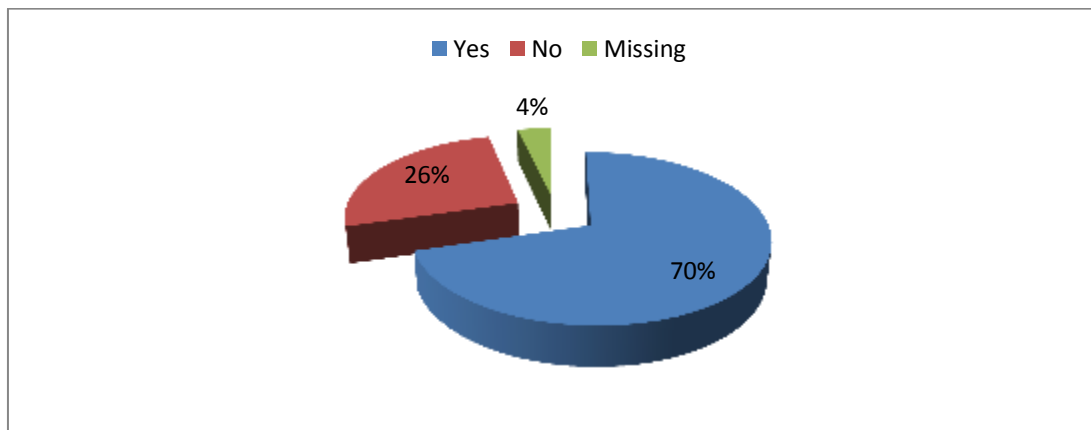


**Table:-** Distribution of Post exposure treatment is urgent.

Post exposure treatment is urgent	Frequency	Percent
Yes	211	70.3%
No	78	26.0%
Missing	11	3.7%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

211(70.3%) emergency health workers had required urgent Post exposure treatment, and 11(3.7%) emergency health workers were missing.

The value of z is 10.8667. The value of p is < .00001. The result is significant at p < .05.



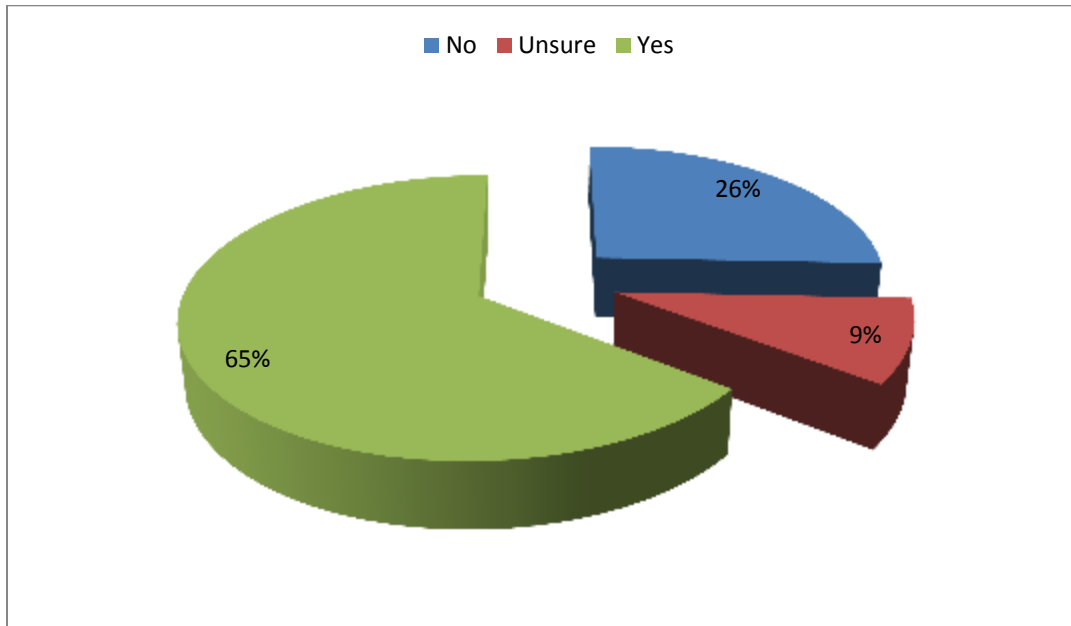
**Table:-** Distribution of current knowledge in rabies prevention?

Current knowledge in rabies prevention?	Frequency	Percent
No	77	25.7%
Unsure	29	9.7%
Yes	194	64.7%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

29(9.7%) emergency health workers were unsure, and 194(64.7%) emergency health workers were current knowledge in rabies prevention.



The value of z is 9.598. The value of p is < .00001. The result is significant at p < .05.

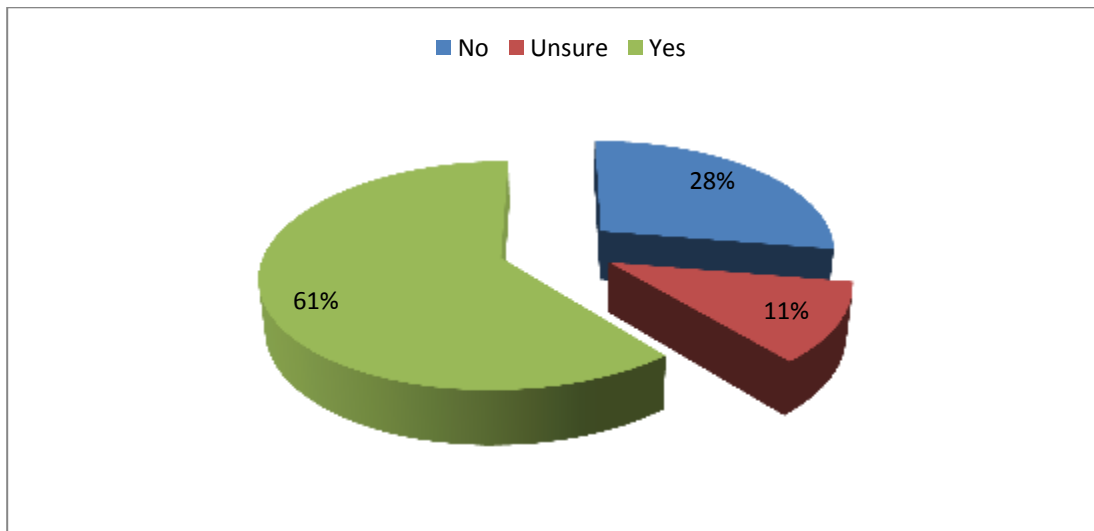


**Table:-**Distribution of current rabies prevention practices?

Current rabies prevention practices?	Frequency	Percent
No	83	27.7%
Unsure	34	11.3%
Yes	183	61.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

34(11.3%) emergency health workers were unsure, and 183(61.0%) emergency health workers were current rabies prevention practices.

The value of z is 8.2179. The value of p is < .00001. The result is significant at p < .05.



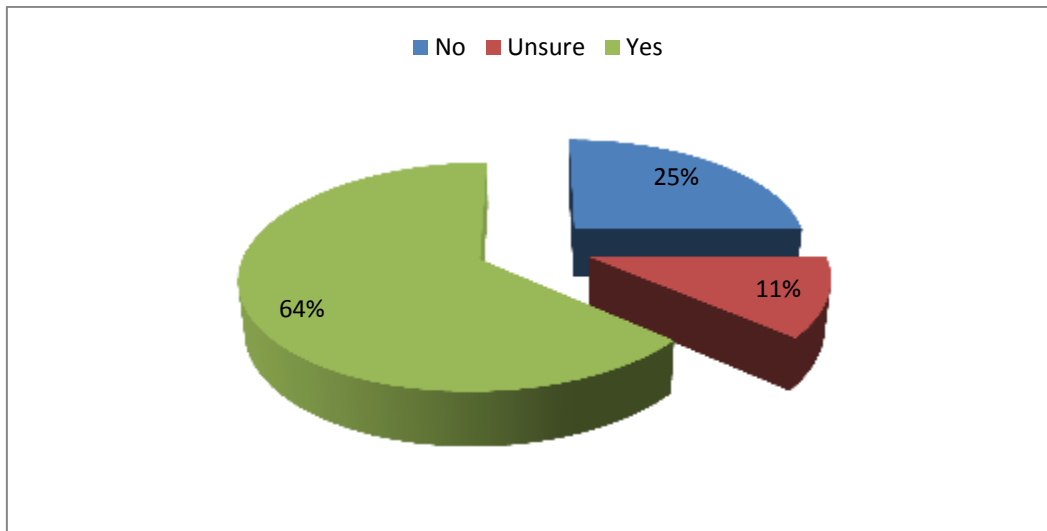
**Table:** Distribution of assessing and recognizing rabid bites?

Assessing and recognizing rabid bites?	Frequency	Percent
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<b>No</b>	75	25.0%
<b>Unsure</b>	34	11.3%
<b>Yes</b>	191	63.7%
<b>Total</b>	300	100.0%

34(11.3%) emergency health workers were unsure, and 191(63.7%) emergency health workers were assessing and recognizing rabid bites.

The value of z is 9.5328. The value of p is < .00001. The result is significant at p < .05.

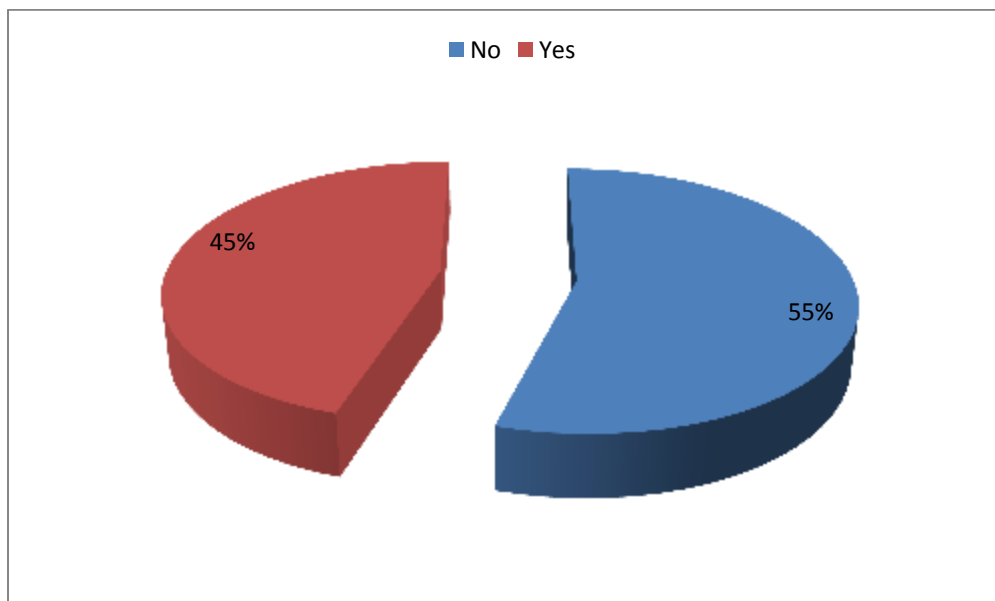


**Table:-** Distribution of vaccine preparations and their individual uses?

<b>Vaccine preparations and their individual uses?</b>	<b>Frequency</b>	<b>Percent</b>
<b>No</b>	164	54.7%
<b>Yes</b>	136	45.3%
<b>Total</b>	300	100.0%

136(45.3%) emergency health workers were vaccine preparations and their individual uses.

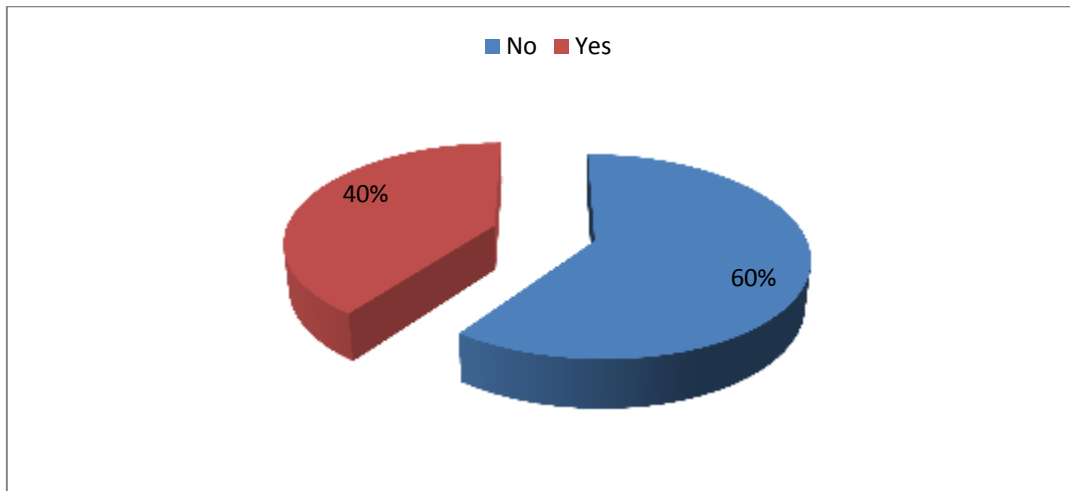
The value of z is 2.2862. The value of p is .02202. The result is significant at p < .05.



**Table:-** Distribution of preparations and their individual uses Complete Immunoglobulin

Preparations and their individual uses Complete Immunoglobulin	Frequency	Percent
No	180	60.0%
Yes	120	40.0%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

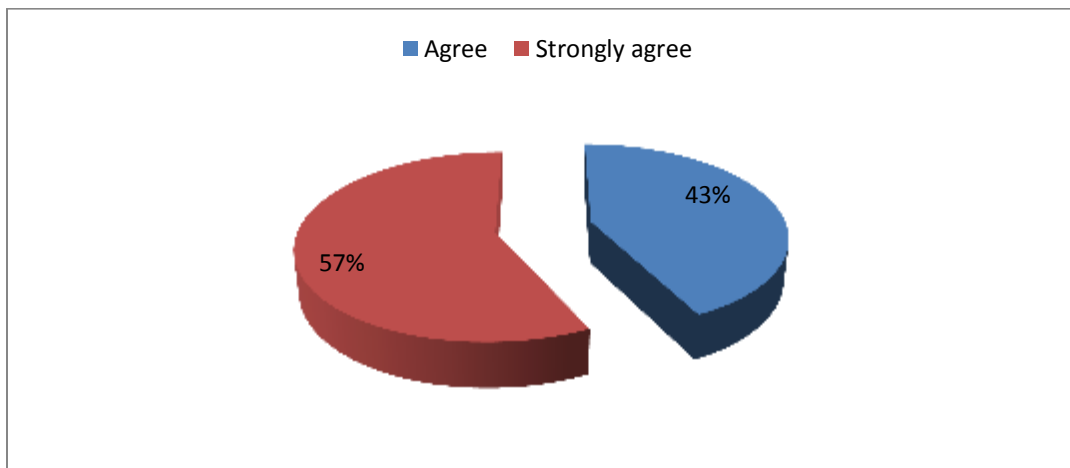
120(40.0%) emergency health workers were preparations and their individual uses Complete Immunoglobulin. The value of z is 4.899. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of Putting up protocol based posters in the ED.

Putting up protocol based posters in the ED	Frequency	Percent
Agree	128	42.7%
Strongly agree	172	57.3%
<b>Total</b>	<b>300</b>	<b>100.0%</b>

128(42.7%) emergency health workers were agree for Putting up protocol based posters in the ED and 172(57.3%) emergency health workers were strongly agree for Putting up protocol based posters in the ED. The value of z is 3.5926. The value of p is .00034. The result is significant at p < .05.

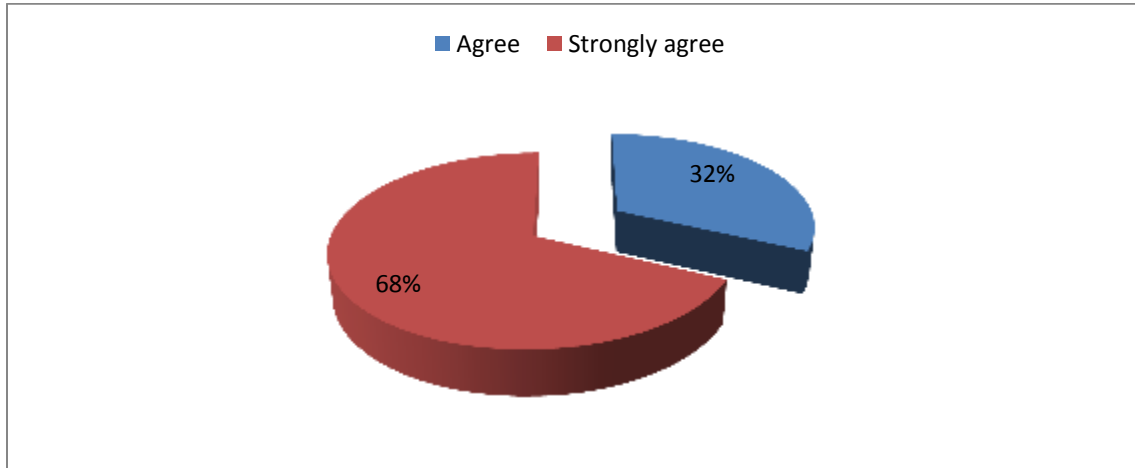


**Table:-** Distribution of do you think regular updates on rabies prevention will help?

Do you think regular updates on rabies prevention will help?	Frequency	Percent
Agree	96	32.0%

<b>Strongly agree</b>	204	68.0%
<b>Total</b>	300	100.0%

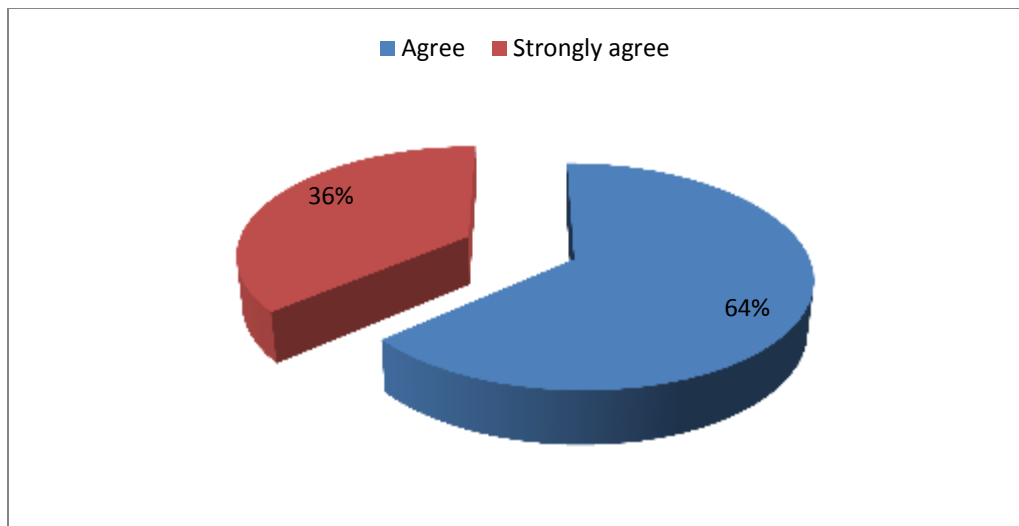
96(32.0%) emergency health workers were agree regular updates on rabies prevention will help and 204(68.0%) emergency health workers were strongly agree regular updates on rabies prevention will help. The value of z is 8.8182. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of do you think we need upgraded national guidelines in India?

<b>Do you think we need upgraded national guidelines in India?</b>	<b>Frequency</b>	<b>Percent</b>
<b>Agree</b>	191	63.7%
<b>Strongly agree</b>	109	36.3%
<b>Total</b>	300	100.0%

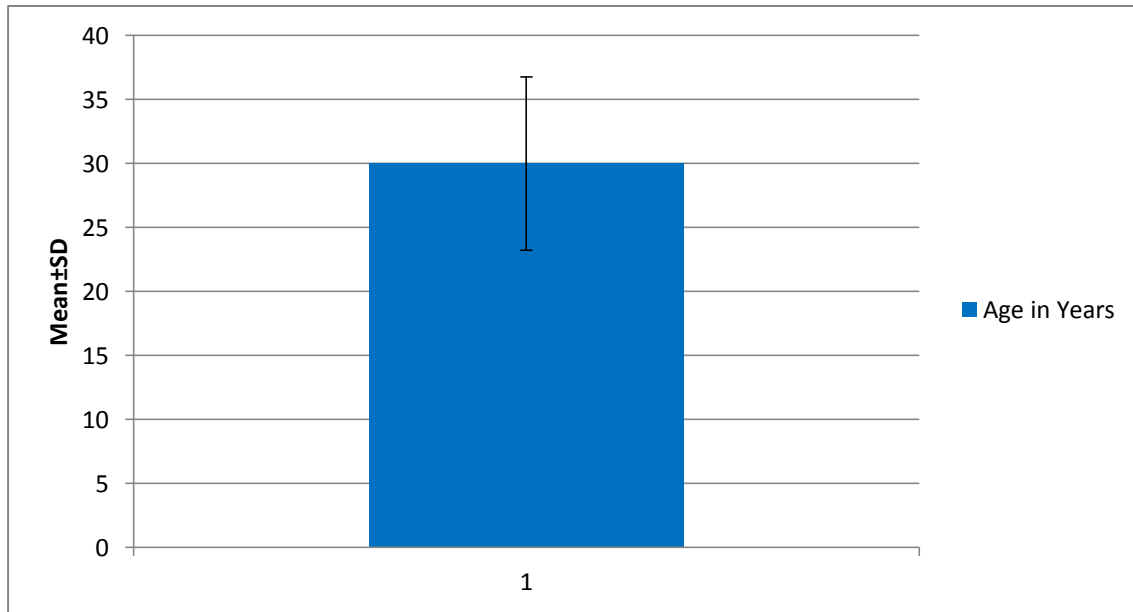
191(63.7%) emergency health workers were agree upgraded national guidelines in India and 109(36.3%) emergency health workers were strongly agree upgraded national guidelines in India. The value of z is 6.6953. The value of p is < .00001. The result is significant at p < .05.



**Table:-** Distribution of mean Age in Years.

	<b>Number</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Median</b>
<b>Age in Years</b>	300	29.9800	6.7591	22.0000	47.0000	28.0000

In above table showed that the mean age in years (mean±s.d.) of emergency health workers was 29.9800±6.7591year.



### Discussion:-

The study was conducted among the health workers and nursing staff of Emergency Department. The expected duration of the study was approximately 1 ½ year between May 2018 to August 2019

We had taken 300 emergency health workers. Out of 300, 54 (18.0%) emergency health workers were MO/RMO, 23(7.7%) emergency health workers were Others, 138 (46.0%) patient were PGT/Resident and 85(28.3%) emergency health workers were Registrar/Consultant .

We found that 201(67.0%) emergency health workers were under age group 1 (21-30 Years), 67(22.3%) emergency health workers were under age group 2 (31-40 Years) and 32(10.7%) emergency health workers was under age group 3 (41-50 Years). The mean age in years (mean±s.d.) of emergency health workers was 29.9800± 6.7591year. Patients with 21-30 yrs was significantly higher than others. It was found that 107(35.7%) emergency health workers were female and 193(64.3%) emergency health workers were male.

Chowdhury R et al <sup>27</sup> (2013) found that among the total of 80 interns, 56.3% and 72.6% of interns did not categorize bites into single transdermal bite and licks on broken skin as Cat-III wound.

Praveen G et al <sup>35</sup> (2014) found that 80 (88.8%) knew that rabies is caused by virus. 15 (16.6%) students knew that 5 doses of vaccine should be taken when bitten by animal. Only 2 (2.2%) were aware of RIGs. More than 50% of the students knew about symptoms and post exposure measures correctly. Students had poor knowledge about the other modes of transmission, animal that can transmit rabies, Rabies immunoglobulin and number of vaccine doses. The knowledge regarding rabies prevention among male and female students is same.

Chopra D et al <sup>38</sup> (2017) found that the current study observed that the knowledge and awareness of the study subjects on the rabies/ animal bite was variable, high in some aspects and low/poor in others. Majority of the subjects had poor grading of knowledge. There is a need for generating awareness about rabies and animal bite.

We found that 33(11.0%) emergency health workers were others, 218(72.7%) emergency health workers were Private, and 49(16.3%) emergency health workers were Public/ Governmental sector.

We found that 6(2.0%) emergency health workers were B Sc(Nursing), 17(5.7%) emergency health workers were GNM, 67(22.3%) emergency health workers were MBBS, 15 (5.0%) emergency health workers were MCEM, 17 (5.7%) emergency health workers were MD and 178 (59.3%) emergency health workers were MEM.

We found that 140(46.7%) emergency health workers were Active immunization, 67(22.3%) emergency health workers were both can be given and 77 (25.7%) emergency health workers were Passive immunization. It was found that 147(49.0%) emergency health workers were Category I, 46(15.3%) emergency health workers were Category II and 89(29.7%) emergency health workers were Category III. It was found that 77(25.7%) emergency health workers had 0.1 ml Intramuscular dose and 193(64.3%) emergency health workers had 1 ml Intramuscular dose. The value of z is 9.5191. The value of p is < .00001. The result is significant at  $p < .05$ .

Jain P et al<sup>28</sup> (2014) found that very low level of awareness about the postdog bite management of wounds as well as about the disease rabies group of people questioned and also reveals serious gaps in understanding of wound severity, classification and correct application of PEP with ARV vaccine and RIG. There is definitely a gap in people's knowledge, attitude, and practices about dog bite and its management and there is need of taking serious measures.

Our study found that 121(40.3%) emergency health workers had 0.1 ml dose of ARV and 141(47.0%) emergency health workers had 1 ml dose of ARV.

We found that 133(44.3%) emergency health workers had 10 iu/kg dose of ERIG, 81(27.0%) emergency health workers had 20 iu/kg dose of ERIG and 43(14.3%) emergency health workers had 30 iu/kg dose of ERIG. We found that 87(29.0%) emergency health workers had 10 iu/kg dose of HRIG, 183(61.0%) emergency health workers had 20 iu/kg dose of HRIG and 15(5.0%) emergency health workers had 30 iu/kg dose of HRIG.

Kumar D et al<sup>41</sup> (2014) found that nearly 72% responded correctly regarding post exposure prophylaxis (PEP) i.e. 5 dose regimen of intramuscular administration of Anti Rabies Vaccine (ARV) and 56.7% doctors were unaware about the current recommendation of intradermal (ID) route. Rabies immunoglobulin (RIG) against Rabies infection used in Class III bites was known to only 45% of the total doctors.

It was found that 61(20.3%) emergency health workers were any of the above administration of ARV, 180(60.0%) emergency health workers were deltoid administration of ARV, and 40(13.3%) emergency health workers were gluteal administration of ARV.

Our study found 50(16.7%) emergency health workers were both ARV and HRIG, 25(8.3%) emergency health workers were both can not be given, 162(54.0%) emergency health workers were answered dont Know, 37(12.3%) emergency health workers were only ARV and 26(8.7%) emergency health workers were only HRIG.

128(42.7%) emergency health workers were answered dont Know, 49(16.3%) emergency health workers were answered nothing to be given, 74(24.7%) emergency health workers were one booster dose and rabies immunoglobulin, and 49(16.3%) emergency health workers were only two booster doses of ARV sufficient.

Holla R et al<sup>32</sup> (2017) found that timely initiation of post exposure prophylaxis following an animal exposure can result in 100% preventability of this fatal disease. Many participants knew about the Intra Muscular schedule of anti-rabies vaccine and its site of administration for pre exposure prophylaxis. It was observed that most participants had knowledge regarding correct intramuscular regimen of anti-rabies vaccine for post-exposure prophylaxis but less than half were able to differentiate between the intramuscular and intradermal regimens.

Singh A et al<sup>33</sup> (2013) found that a total 62% GPs did not know the high-risk groups to whom pre-exposure prophylaxis has to be given. There was an apparent lack of awareness among the GPs regarding appropriate animal wound management and vaccine administration. Reorientation programs and continued medical education for GPs are required to highlight the WHO guidelines regarding treatment of animal bite.

Kishore S et al<sup>39</sup> (2015) found that most of the study participants (59.9%) obtained a medium score (10-17) in knowledge regarding disease and its prevention. Most of the participants (83.3%) lack knowledge about anti-rabies immunoglobulin and pre-exposure prophylaxis (80.2%). There is a need for sensitization of health workers so that their knowledge can be enhanced and their positive attitude (100% willingness) can be translated into proper practices for prevention and control of Rabies.

We found that 211(70.3%) emergency health workers had required urgent Post exposure treatment, and 11(3.7%) emergency health workers were missing. Tiwari A et al<sup>34</sup> (2018) found that majority (83.1%) of medical students knew about the viral cause of rabies, 93.4% knew the dog as most common reservoir of rabies and 91.8% knew the most common mode of rabies transmission by bites of rabid animal. Majority (71%) of students knew the correct site and only 43.7% knew the correct schedule of vaccination. Only 29% of medical students knew about indication of rabies immunoglobulin.

We found that 29(9.7%) emergency health workers were unsure, and 194(64.7%) emergency health workers were current knowledge in rabies prevention.

Nayak RK et al<sup>46</sup> (2013) found that the knowledge regarding vaccine was very poor among the general practitioners. The major issue was lack of hands on training or updating the knowledge of general practitioners regarding the newer vaccines and their administration.

It was found that 34(11.3%) emergency health workers were unsure, and 183(61.0%) emergency health workers were current rabies prevention practices. 34(11.3%) emergency health workers were unsure, and 191(63.7%) emergency health workers were assessing and recognizing rabid bites.

Chowdhury R et al<sup>27</sup> (2013) found that 12.5% of interns were aware of the intradermal route of vaccination. The results of the study reveal that there are significant gaps in the knowledge regarding the management of animal bite injuries and immunisation. Bailey JL et al<sup>31</sup> (2018) found that despite the high efficacy of current rabies vaccines, awareness about rabies preventive healthcare is often low in endemic areas. Kapoor P et al<sup>29</sup> (2019) found that only 22.5% respondents had good knowledge, 56% had fair, and 21.5% had poor knowledge. One fourth of the participants knew that rabies is not curable, however, approximately 83% knew that it is preventable. Approximately 15% of the attendees had a wrong concept that a single injection is sufficient for immunization.

We found that 136(45.3%) emergency health workers were vaccine preparations and their individual uses. Shankaraiah RH et al<sup>40</sup> (2013) found that the knowledge, attitude and practice of this anti rabies and the appropriate life-saving use of immunoglobulins were inadequate. The present study also showed that there was a significant difference between knowledge, attitude, and practice. Knowledge, attitude, and practice needs to be improved through properly designed awareness programmes for all health workers dealing with rabies exposures.

Our study found that 120(40.0%) emergency health workers were preparations and their individual uses Complete Immunoglobulin. 128(42.7%) emergency health workers were agree for Putting up protocol based posters in the ED and 172(57.3%) emergency health workers were strongly agree for Putting up protocol based posters in the ED. Tiwari HK et al<sup>37</sup> (2018) found that the lack of awareness regarding rabies amongst rural primary care health staff and their adverse practices towards the management of dog-bite wounds is a major contributor to the high incidence of rabies infection and subsequent human mortality in India. The more experienced and better-educated workers were found to have a good awareness of rabies (OR 3.4, 95%CI 1.0–12.1) and good practices towards dog-bite wound management (OR 5.6, 95%CI 1.2–27.0).

Our study found that 96(32.0%) emergency health workers were agree regular updates on rabies prevention will help and 204(68.0%) emergency health workers were strongly agree regular updates on rabies prevention will help. 191(63.7%) emergency health workers were agree upgraded national guidelines in India and 109(36.3%) emergency health workers were strongly agree upgraded national guidelines in India.

Hwang GS et al<sup>45</sup> (2019) found that only 56% (96 of 170) of patients with a wound that could be infiltrated with rabies IG actually received rabies IG via infiltration into and around the wound.

### **Conclusion:-**

We found that majority of emergency health care workers were answered active immunization and WHO Category I in rabid bites which were statically significant.

It was found that maximum emergency health care workers were answered 1 ml Intramuscular dose of ARV, 1 ml Intra dermal dose of ARV , 10 iu/kg dose of ERIG , 20 iu/kg dose of HRIG , deltoid administration of ARV and Both ARV and HRIG which were statically significant.

Our studies found that higher proportion of emergency health care workers were answered don't Know for rabies immunization in special scenarios like in immunocompromis patients and booster dose in patient who received pre exposure prophylaxis .

It was found that majority emergency health care workers were answered current knowledge in rabies prevention, current rabies prevention practices and assessing and recognizing rabid bites that were statically significant.

We found that higher proportions of emergency health care workers were answered vaccine preparations which were statically significant.

It was found that majority emergency health care workers were answered preparations and their individual uses Complete Immunoglobulin.

It is recommended that a mandatory training module for emergency health care staff to be developed and implemented to improve their knowledge regarding rabies. There is a need for sensitization of health workers so that their knowledge can be enhanced and can be translated into proper practices.

**Limitations of the Study:**

In spite of every sincere effort my study has lacunae.

**The notable short comings of this study are:**

1. The sample size was small. Only 300 cases are not sufficient for this kind of study.
2. The study was carried out in tertiary care hospitals, so hospital bias cannot be ruled out.
3. The study population is being tested upon a confined set of questionnaire and it may not cover the entire range of questions.
4. The study is conducted upon only health workers of emergency medicine which include only a part of health workers

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