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The Journal

The APCRI has become a prime and one of the most vibrant scientific organization in the field of rabies elimination with strength of about 750 life members and 40 Founder Life Members. Now APCRI serves as a platform that brings together the best minds in the country comprising of medical professionals, veterinary doctors and others for Advocacy, Research & information dissemination about prevention & control of Rabies. APCRI led by an excellent team of rabies experts and dedicated people and is actively involved in conducting rabies related research, organizing conferences, Continuing Medical Education (CME) programmes, symposia, lectures, trainings, scientific publications, book release, etc. and has a pan India representation with global impact.

APCRI has its own official indexed and peer reviewed journal on prevention and control of rabies which is published biannually. It is indexed in Index Copernicus International vide ISSN 0973-5038.

APCRI, with the technical and financial assistance from World Health Organization (WHO) undertook the landmark national multi-centric rabies survey India during 2002-2004. In 2017, it conducted another Indian multi-centric rabies survey to assess programmatic experiences on rabies control with technical and operational support of WHO.

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CONTENTS	Pages
● General Information	02
Editorial	
● Lets Fight Rabies Unitedly <i>Dr. Kajal Krishna Banik, Editor, APCRI</i>	04
● Foreword – <i>Dr. M.K. Sudarshan, Founder President & Mentor, APCRI</i>	05
Special Articles	
● The World Health Organization recommendations on rabies prophylaxis, 2018: What India should do? <i>Dr. M.K. Sudarshan</i>	06
● Safety of anti rabies vaccination during pregnancy <i>Dr Snehamay Chaudhuri</i>	09
● Event-times in Intradermal Anti-Rabies Vaccination among Patients with Category II Exposure in Kolkata: Evidence for Enforcing Skill-Based Practices <i>Dr. Arista Lahiri, Dr. Arup Chakraborty, Prof. (Dr.) Krishnadas Bhattacharyya</i>	11
● Failure of Post-Exposure Treatment in Rabies Prophylaxis: Probable Cause <i>Dr H K Gohil, Dr Sumit Poddar</i>	18
● Clinical Safety of Rabies Monoclonal Antibodies: A Follow up study conducted at ARC, VIMSAR, Burla <i>Prof. Durga Madhab Satapathy, Dr. Devasish Panda, Dr. Subrat Kumar Pradhan, Dr. Sithun Kumar Patro</i>	26
Original Articles	
● PEP seeking behaviour in an urban poor locality <i>Ravish HS, Pankaj Kumar, Ramya MP, Nitu Kumari, Jitin S</i>	30
● Epidemiological profile of animal bite cases attending Primary Health Centre, Sanquelim for Rabies PEP <i>Dr. Jagadish A. Cacodcar, Dr. Saili S. Pradhan, Dr. Nikhil S. Akarkar</i>	36
● Monkey bite menace in a village in South Delhi <i>Aparnavi P, Geeta Pardeshi, Neelam Roy, Anita Verma, Timiresh Das, Sunil K Singh</i>	40
● Comparison of Immunochromatographic Test and Reverse Transcriptase Polymerase Chain Reaction for Detection of Rabies virus in Live as well as Post mortem animals <i>Vagheshwari D. H., Bhanderi B. B., Mathakiya R. A., Jhala M. K.</i>	46
● Clinical Profile and Factors associated with Hydrophobia Cases admitted in Isolation ward at Tertiary Care Hospital, Ajmer <i>Dr. (Mrs) Renu Bedi, Dr. Bharat Meharda, Dr. Arshiya Bharti, Dr. Devraj Rao</i>	52
● Community Belief, Myths and Perceptions about Animal Bite Cases in an Urban area of Berhampur: A Qualitative study <i>Dr Nivedita Karmee, Prof. Durga Madhab Satapathy, Prof Radha Madhab Tripathy, Dr Sithun Kumar Patro, Dr Smaranita Sabat</i>	59
● APRICON 2019 Announcement	64
● Guidelines for applying for “Young Scientist Award”	65
● Application for “Young Scientist Award”	66
● INSTRUCTIONS TO AUTHOR	67
● APCRI Membership Application Form	77
● Application for Issuance of Identity Card & Changing of Corresponding Details	79

EDITORIAL



Lets Fight Rabies Unitedly

Since the discovery of Louis Pasteur in 1885 and the start of the journey of Association for Prevention and Control of Rabies in India (APCRI) in 1998, we have travelled a long distance so far the prevention and control of Rabies in our country. But nothing significant came out during this long period of time. India remains one of the most affected country in dog bite and rabies in the world. It's a fact that since its inception APCRI is trying its level best to control the Rabies related human deaths. We have tried to increase Rabies awareness,

increased use of post exposure prophylaxis with modern cell culture vaccines and introduction of intra dermal rabies vaccination (IDRV). All these have resulted in reduction of rabies related deaths in the past decades. But still now one thirds of the yearly global rabies deaths occur in India making it the country with highest rabies fatalities in Asia and second highest in the world.

But launch of the Global Rabies Framework in 2015 celebrated the proof that rabies can be eliminated in various settings and the shared goal of reaching zero human deaths from rabies by 2030 worldwide.

As health and wellbeing of people is one of the most important issue to the United Nations, World Health Organisation (WHO) also had taken rabies as a good indicator of a successful health system and a model for "One health" collaboration.

The latest WHO Expert Consultation on Rabies elaborately described the present status and the ways forward.

APCRI as one of the pioneer organisation in this field has to play its own role by educating and motivating our own treating physicians across the country in the management of rabies at large. Keeping that in mind we are trying to organise CMEs, publishing newsletter dedicated on the subject and the journal of the APCRI containing original articles and research works from experts.

Hope more and more members of the association and scientists and teachers will come forward to publish their works in this prestigious journal in future.

Dr. Kajal Krishna Banik

MBBS, DPH, MAE

Editor

APCRI Journal

FOREWORD



It is heartening to note that the APCRI Journal is now under the care of a committed team of professionals. I am also happy to see the new website of the journal – www.apcrijournal.com as more informative and organized. The members of the APCRI must now proactively contribute articles to the journal. Simultaneously the journal committee must also contact the institutions and individuals who are working on rabies for providing articles. The indexing of the journal by index Copernicus should help the teachers from medical colleges to provide articles as it is recognized by the medical council of India.

The present issue of the journal i.e. of January, 2019 is brought out by the new team and hopefully it meets the aspirations of the association. I wish the committees of journal and the association all success in their future endeavours.

Lastly, the association thrives on the funds received from the pharmaceutical corporate & other agencies and as a result such funds must be prudently used. The elected office bearers are entrusted by the members of the association to honestly and wisely use the funds of the association. Consequently, the office bearers must exercise caution and follow set norms of handling of public funds.

Date: 12th January, 2019

DR. M. K. Sudarshan

MD (BHU), FAMS, Hon. FFPH

Founder President & Mentor, APCRI

SPECIAL ARTICLE

The World Health Organization recommendations on rabies prophylaxis, 2018: What India should do?

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1. Preamble

Globally about 59,000 human rabies deaths are known to occur annually of which about 20,000 (one third) is from India alone. Recently in 2015, WHO declared the global goal of achieving dog mediated human rabies free world by 2030 to which India is also committed to. Till 2004 the nerve tissue (Sheep brain/ Semple) vaccine (NTV) formed the mainstay of rabies vaccination and the use of rabies immunoglobulin (RIG) was very low (2%) in the country. Following the stoppage of production of NTV in 2004, there was an immediate shift to cell culture vaccine (CCV) by intramuscular route (IM) that led to sudden scarcity of rabies vaccine in the country. Consequently, in 2006 the Government of India introduced the cost and vaccine saving intra-dermal rabies vaccination (IDRV) and simultaneously there was an increased production of CCVs both in the public and private sectors. Also the indigenous production of the Equine RIGs was started in the private sector. Though there was a good demand for rabies vaccine, the demand for RIGs was very poor due to professional apathy and public ignorance.

Recently in 2017 the Serum Institute of India, Pune has launched its indigenously produced and the world's first human rabies monoclonal antibody (R'Mab)

2. Current scenario

The current annual production of rabies vaccine (about four main brands – Rabipur, Abhayrab, Vaxirab-N & Indirab and other/ co-brands like Zoonovac-V, BeRab, XP-Rab, etc) in the country is about 30 million doses (2015-16); ERIG 1.5 million vials and R'Mab about 2 lakh vials since its launch in September, 2017 (personal communication). Occasionally a small and variable quantity of rabies vaccine is imported from China. The human RIG is imported and its quantity & availability are varied.

The rabies post-exposure prophylaxis (PEP) is by IM route in the private sector and in the government sector it is mostly by intra-dermal (ID) route in the bigger institutions and IM route in the smaller institutions. As rabies vaccine is procured by the state governments its availability is very varied among the different states.

Overall, in a recent WHO-APCRI survey of seven states, the vaccine availability was found "good" in the states of Gujarat, Kerala and Himachal Pradesh; "satisfactory" in Madhya Pradesh & Bihar and "bad" in Manipur. Though the use of RIG has improved from 2% in 2003 to 16% in 2017 but still in many instances it is being wrongly injected by IM route (34%). (APCRI, 2018)

The schedules of vaccination approved currently for use in India for post-exposure prophylaxis (PEP) are the five dose Essen regimen by IM route -one dose each injected on days 0-3-7-14-28, i.e. 1-1-1-1-1 ; updated Thai Red Cross Society (TRCS) by ID route , one dose of 0.1mL vaccine injected at two sites on days 0-3-7-28, i.e. 2-2-2-0-2 ; for pre-exposure prophylaxis (PrEP) – one vial of vaccine by IM route or 0.1mL of vaccine by ID route injected on days 0-7-21 or 28. (Government of India, 2015)

3. The WHO recommendations, 2018 on rabies prophylaxis (WHO, 2018, a)

3.1. The vaccine regimens: The following regimens are approved for use.

Regimen (post-exposure/PEP) and (pre-exposure, PrEP) regimen	Duration of course	No. of injection sites per clinic visit (days 0,3,7,14,21-28)
WHO – recommended intradermal regimen (PEP)		
1 week, two sites	7days	2-2-2-0-0
WHO-recommended intramuscular regimens (PEP)		
2 weeks	14-28 days	1-1-1-1-0
3 weeks	21 days	2-0-1-0-1
WHO –recommended intradermal regimen (PrEP)		
Two visits	7 days	2-0-2-0-0
WHO –recommended intramuscular regimen (PrEP)		
Two visits	7days	1-0-1-0-0

3.2. Use of rabies immunoglobulins

Infiltrate as much as possible into the wound; the remainder of the calculated dose of RIG does not need to be injected IM at a distance from the wound but can be fractionated in smaller, individual syringes to be used for other patients, aseptic retention given. If RIG is not available, thorough, prompt wound washing, together with immediate administration of the first vaccine dose, followed by a complete course of rabies vaccine, is highly effective in preventing rabies. Vaccines should never be withheld, regardless of the availability of RIG.

If a limited amount of RIG is available, RIG allocation should be prioritized for exposed patients based on the following criteria: Multiple bites, deep wounds, bites to highly innervated parts of the body (such as head, neck and hands), severe immunodeficiency, the biting animal is a confirmed or probable rabies case, and bites, scratches or exposures of mucous membranes caused by a bat.

If available, the use of MAb products instead of RIG is encouraged (WHO, 2018, b).

4. What India should do now?

India is heavily burdened with the problem of human rabies mortality despite producing good amounts of rabies vaccine and ERIG/R’Mab and even exporting them. India has a federal structure, health is a subject under the domain of the states and as a result currently rabies biologicals are procured directly by the state governments from the vaccine producers using the state budget and consequently there is very little role for the central government.

The above recommendations of WHO need to be reviewed for its adoption/acceptance for implementation in the country by a national expert consultation and this is due at NCDC, Delhi on 8th January, 2019. Following a scarcity of rabies vaccines (& RIG) locally, Himachal Pradesh has gone a step ahead and already implemented the recent WHO recommendations. The new recommendations of the WHO for PEP has shortened the regimens from four weeks / 5 doses to three to four weeks / 4 doses (IM regimen) and from four weeks / 4 doses to one week / 3 doses (ID regimen). This is based on the clinical evidence of a single study from Cambodia, in a small population, using one vaccine (0.5mL, PVRV) that has limited reach out globally. In India, this vaccine is no more in use and besides four main other brands of vaccine are widely in use.

As rabies is practically 100% fatal, it is important that any reduction in the dosage/regimen of this life saving vaccine must be based on clinical evidence that is generated locally. Incidentally, prior to launching of the IDRV in the country in 2006, a national multicentric feasibility study was conducted in 2004-2005 by National Institute of Epidemiology, Indian Council of Medical Research, Chennai, using the locally available vaccines. Hence, even this

time it is important that local evidence is generated before effecting any shortening of the PEP regimens. This will also meet the regulatory requirements of the Drug Controller General of India, New Delhi for change of label/package inserts of the rabies vaccines.

The new change in the procedure/practice of use of RIG giving it only locally/infiltrating into the wounds without any systemic injection (of the quantity left over after injecting all wounds) is based on the evidence generated by a centre in Shimla, HP, India and this too needs approval of national expert consultation .

Since human R'Mab, produced indigenously by Serum Institute of India is available, its use instead of RIG as recommended by WHO also needs to be finalized by the national expert consultation.

Lastly, APCRI must play a strong scientific advisory and advocacy role in this endeavour at the national level to ensure that effective regimen/s of rabies PEP are formulated to prevent human rabies deaths in the country.

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SPECIAL ARTICLE

Safety of anti rabies vaccination during pregnancy

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Rabies has a mortality rate of nearly 100% to pregnant women and an indeterminate risk to the fetus¹. According to WHO-APCRI National Multicentric Rabies Survey, there are an estimated 17.4 million animal bite cases annually in India². Rabies incidence in India has been constant for a decade with 18,000 to 20,000 cases of rabies a year (about 36% of the world's deaths from rabies) and there is no obvious declining trend. The reported incidence is probably an underestimate of true incidence because in India rabies is still not a notifiable disease³. Thus India remains a high-risk environment for rabies.

Symptoms of rabies usually develop 2-8 weeks after contact with a rabid animal. In clinically manifested rabies, nonspecific prodromal symptoms progress to encephalitis marked by confusion, hallucinations, and bizarre thoughts that are interspersed by shortening periods of lucid thought. Dysregulation of the autonomic nervous system and involvement of the brainstem and cranial nerves lead to the classic "foaming at the mouth" appearance⁴. Once symptoms of rabies develop, rabies is fatal. However rabies can be prevented by vaccination. Rabies vaccine is also curative if given post exposure before the manifestation of clinical symptoms.

According to the national guideline the post-exposure prophylaxis is a three-pronged approach⁵. All three carry equal importance and should be done simultaneously as per the category of exposure (i) Management of animal bite wound(s) - Washing of wound(s) should be carried out as soon as possible with soap and water. Since the rabies virus can persist and even multiply at the site of bite for a long time, wound(s) toilet must be performed even if the patient reports late (ii) Passive immunization with Rabies Immunoglobulin (RIG). In category III exposures rabies immunoglobulin should be infiltrated in the depth and around the wound(s) to neutralize the locally present virus. Anti-rabies serum or RIG has the property of binding with the rabies virus, thereby resulting in neutralization and thus loss of infectivity of the virus and hence it is most logical to infiltrate RIG locally at the site of exposure. Two types of RIGs are available: Equine Rabies Immunoglobulin (ERIG): ERIG is of heterologous origin produced by hyper-immunisation of horses. Currently manufactured ERIGs are highly purified Fab 2' fragments and the occurrence of adverse events has been significantly reduced. These are produced in the country in public and private sectors and are known to be safe in pregnancy. Human Rabies Immunoglobulin (HRIG) - HRIG are of homologous origin and are relatively free from the side effects encountered in a serum of heterologous origin. However, it is expensive and is imported from other countries. (iii) Active immunization with Anti-Rabies Vaccines (ARV) Active immunization is achieved by administration of safe and potent cell culture vaccines (CCVs) or purified duck embryo vaccine (PDEV). Currently available CCVs could be administered by IM regimen and CCVs approved for ID use shall be administered by ID regimen⁵.

The pregnant women constitute a special and sizeable group and continue to remain vulnerable to this fatal disease following exposure to rabid animals. However, animal bites in pregnant women are a rare event and the victims mostly consult their family physicians or obstetricians for advice⁶. The administration of rabies vaccines and immunoglobulin during pregnancy poses a number of concerns to physicians and patients about the risk of transmission of virus to developing fetus and harmful side effects to the mother and fetus.

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Centre for Disease Control and Prevention (CDC) on general recommendation on immunization mentions that “Benefits of vaccinating pregnant women usually outweigh potential risks when the likelihood of disease exposure is high, when infection would pose a risk to the mother or fetus, and when the vaccine is unlikely to cause harm”⁷. Rabies vaccine is an inactivated whole-cell viral vaccine. In general, there is no evidence exists of risk to the fetus from vaccinating pregnant women with inactivated virus vaccine⁸.

Studies about the safety of rabies post exposure prophylaxis (PEP) in pregnancy had been performed since 1990s. The consensus from all of these studies is that rabies PEP is safe during pregnancy.⁹ There have been no identified associations between rabies vaccination and fetal abnormalities⁴. Sudarshan M.K. reported the safety of pregnant woman in India receiving both the rabies vaccine and RIG for treatment and found safe for the mother and fetus⁶. Following vaccination during pregnancy individual subjects present with mild adverse effects such as pain, erythema, fever, headache and fatigue, which are mild symptoms not requiring medication and do not cause long-term physical or mental effects on the patients. The adverse effects in pregnancy are not more severe than that of general populations⁹.

CDC on its recommendation on anti rabies vaccination concludes that because of the potential consequences of inadequately managed rabies exposure, **pregnancy is not considered a contraindication to postexposure prophylaxis**. Certain studies have indicated no increased incidence of abortion, premature births, or fetal abnormalities associated with rabies vaccination. **If the risk of exposure to rabies is substantial, pre-exposure prophylaxis also might be indicated during pregnancy**. Rabies exposure or the diagnosis of rabies in the mother should not be regarded as reasons to terminate the pregnancy¹⁰.

However, there is concern over the facts that even after receiving PEP the women may sought further information from other physicians, family members and friends. The women may suffer pressure from family and society and as result may refuse to take further PEP or terminate pregnancy^{6,9}. Thus health education of both health care personnel and common people is needed to eliminate the perceived safety concerns over the use of rabies vaccines for pregnant women and to avoid unnecessary consequences like abortions or incomplete PEP. Rabies PEP during pregnancy must be maximized to effectively prevent the occurrence of rabies.

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SPECIAL ARTICLE

Event-times in Intradermal Anti-Rabies Vaccination among Patients with Category II Exposure in Kolkata: Evidence for Enforcing Skill-Based Practices

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Abstract

Background: Times associated with the events in the process of Anti-Rabies Vaccination (ARV) need to be studied as these may be related not only with queuing but also with successful vaccination. To estimate different event-times within the process of ARV administration among patients with category II exposure in Kolkata. **Methodology:** An observational time-study was conducted in an ARV clinic in Kolkata among 129 patients attending with category II exposure over two-weeks. Observations were made regarding success of the vaccination process. The variability of different event-times were analysed with respect to successful or partially successful vaccination among both male and female patients. **Results:** The mean age of the participants was 26.26 (\pm 17.18) years with 54.26% being male. The mean time required for preparation of vaccine, drawing into syringe, having a skin-pinch & injecting the vaccine intra-dermally were 11.54, 18.44, 4.95, 9.32 seconds respectively for female patients. While for male patients these event-times were 11.27, 23.44, 5.36 & 9.66 seconds respectively. In 20.16% patients, vaccination process was partially successful. For successful vaccination, the durations for pulling skin-stretch and then injecting the vaccine were higher compared to the partially successful administering of vaccine in both the sexes. The difference of durations in injecting the vaccine was found statistically significant in both males & females. **Conclusion:** Since shorter time given in pulling skin-pinch and injecting was related to partially successful vaccination, the process should therefore be completed without any hurry to ensure proper dosing. Skill-training regarding pulling skin-pinch for ID injections & then injecting carefully may improve the service delivery.

Keywords: Anti-Rabies Vaccine, Event-times, Intra-dermal, Post-exposure Prophylaxis, Time study.

BACKGROUND:

Rabies, a fatal disease occurring in human beings after bite or exposure to animals infected with rabies virus is prevalent in over 150 countries in the world.¹ Though transmission of rabies via animal bite is a global phenomenon, still Asian and African regions remain in the focus.² In India it is estimated that around 18,000 to 20,000 people die from rabies each year, yet the true burden remain unknown.^{2,3} Around 40% of those bitten by a suspected rabid animal are children as reported by the World Health Organization.¹

The Global Alliance for Rabies Control (GARC) in collaboration with World Organization for Animal Health, Food and Agriculture Organization and World Health Organization have put forward the global strategic plan "Zero by 2030" to reduce the human deaths from rabies to zero by the year

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2030.4,5 The call to unite for a zero-rabies mission has been set forth in India as well.⁶ It is well-understood that rabies is extremely fatal supported by the meagre number of only 15 survivors globally till date⁷, nevertheless completely preventable by effective and efficient public health intervention – vaccination. Post-exposure prophylaxis (PEP) is considered of monumental importance, especially in the Indian context where dog population itself is nothing but huge.

In India, the updated Thai Red Cross regimen (intra-dermal - ID) is followed for prophylaxis.⁸ The steps / events in giving an injection has technical considerations regarding effect of the administered drug(s).⁹ ARV given correctly through intra-dermal route induces the required immunity, however, the correctness is dependent upon following the standard procedure.¹⁰

There are many studies reporting adherence and the practices of the patients after animal bite.^{11–15} But the process related has not been studied much. However, technically event-times in the process of Anti-Rabies Vaccination (ARV) need to be studied in order to make every dose of administered vaccine count and to induce appropriate sero-response. The process as a whole is related to queuing a service delivery point and also the successful delivery of the vaccine. Among all the post-exposure categories patients with category II exposure are the most important in this regard since they are getting the vaccine only. In this backdrop the current study was conducted to estimate different event-times in the process of intra-dermal ARV administration among patients with category II exposure in Kolkata and their relationship with proper vaccination practices.

MATERIALS AND METHODS:

Study design and participants:

An observational time-study was conducted among the patients attending the animal bite vaccination clinic of ID & BG Hospital, Kolkata over one month (November – December, 2017). The study-unit in this study was the complete process of vaccination conducted on the beneficiaries. Processes where any event was not monitored for time, were excluded from the analyses. In order to calculate optimal sample size at 5% precision level 80% power the minimum required ample size was 98. To account for incomplete process observation herewith 30% inflation of sample size was done. Systematic random sampling (taking into account the average daily attendance in the clinic with category II exposure) was used to select the processes to be observed. At the end of data collection period total 129 complete processes of intra-dermal ARV injection were observed and the time events were noted. The scheme of the current study is summarized in **Figure 1**.

Definition of the events:

Apart from topical sterilization of the skin for vaccination, the process of ARV administration via intra-dermal route consists of four key events. Beginning with reconstituting the vaccine in multi-dose vial with diluent till completion of reconstitution, marked the event of preparation of vaccine. From inserting the needle of the syringe to drawing the required dose of vaccine into the needle is the second event of drawing vaccine into the syringe. Before injecting the drawn vaccine a skin-stretch is required in the target area. Starting with touching the area of vaccination by the vaccinator, stretching the skin and finally fixing the stretch with one hand, marks the event of grabbing a skin-stretch. The finally event, regarded as injecting the vaccine has been counted from putting the needle in the skin, injecting the vaccine intra-dermally till removing the needle.

Ideally, intra-dermal injection is considered successful operationally with immediate blabbing on the skin where vaccine has been injected.¹⁶ Technically success of a vaccine can only be warranted upon desired sero-conversion.^{16,17} However, in the current study the authors examined operational success i.e. proper method of vaccination only.

Study tools and data collection:

Time related to events in the process of vaccination was measured by stopwatch (Texla Scientific Instruments®) following standard procedures of time measurements, measuring up to hundredth of a second. The stopwatches used were pre-tested beforehand and the level of precision of the instruments were validated which is beyond the scope of this study. The event times were calculated as the time duration (in seconds) for each of the mentioned events to complete. The basic socio-demographic details like age, religion, residence pertaining to the participants were noted from the record-register after observation of the process completely.

Study variables and statistical analysis:

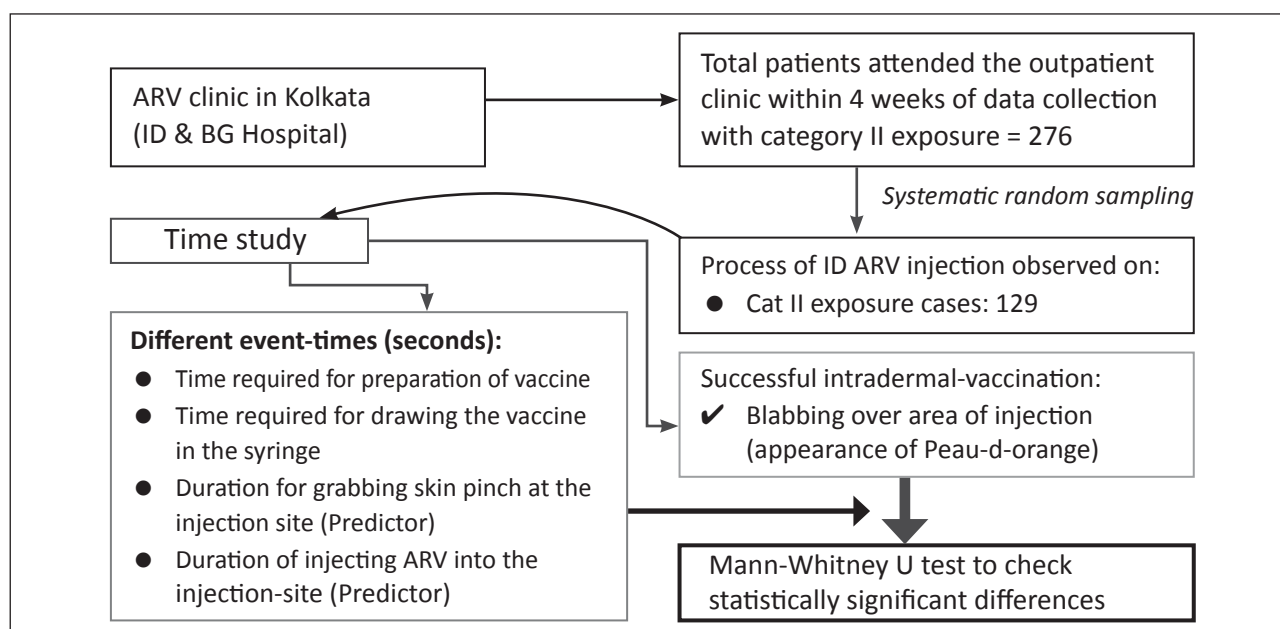
Socio-demographic variables like age, sex, religion, area of residence were considered as the background information regarding the recipients of the ARV. However, along with these, participant-independent process-related background variables were the duration of preparation of vaccine and the time for drawing it into a syringe. The primary outcome variable was operational success/ completeness of intra-dermal vaccination. The remaining two event-times i.e. duration of grabbing a skin pinch and injecting the vaccine were considered the main predictors. The event-times were represented by their mean and 95% confidence interval (95% CI). The injection of ARV is given intra-dermally in both arms at a dose of 0.1 ml each. Therefore the events of skin-stretch and injecting the vaccine had 258 observations from the 129 beneficiaries. Operational success was therefore noted separately for two arms giving 258 observations. In order to categorize outcome overall, proper blabbing in both arms consisted of successful vaccination while otherwise it was considered partial or incomplete vaccination. Because of non-normality of the two event-times the relationships with the outcome were assessed by Mann-Whitney U test. For this purpose the analysis was carried out on the

258 event-times and corresponding outcomes noted. The statistical analysis was done in STATA 14.2 (StataCorp., Texas, USA).

Ethical considerations:

Permissions were taken from the institution and the clinic. Since observing the process not only included the car-seekers but also the care-givers, both the parties were informed about the research and consent obtained. No intervention in the service-delivery was done.

Figure 1: Scheme of study



RESULTS:**Background information:**

Vaccination on 129 beneficiaries attending the out-patient clinic during the data-collection period was observed. The mean age of the beneficiaries were 26.26 (\pm 17.18) years. The youngest beneficiary being aged 7 months and the oldest 79 years old. Among the observed beneficiaries 54.26% were male with the remaining being female. About 41.31% of were from sub-urban areas of Kolkata and 51.42% were residing within the geographical limits of Kolkata Municipal Corporation. The remaining 7.27% were rural residents. Majority were Hindu (64.43%) by religion, followed by Muslims (31.22%).

Event-times in ID vaccination ARV:

The mean duration of different events in the process of ARV administration are summarized in Table 1. Preparation of vaccine vials for drawing vaccine was observed to be completed in 11.395 seconds (95% CI: 11.168 – 11.623). Forty-one such vials (as supplied vials were multi-dose) preparation was observed and the estimate was calculated. The duration was comparable among males and females. The average duration taken by the health care providers to draw the vaccine into the syringe and prepare for injection was 21.155 seconds (95% CI: 20.242 – 22.068). The mean duration for stretching of skin before the process of injection was 5.171 seconds (95% CI: 4.729 – 5.612). This duration was noted to be 4.949 seconds (95% CI: 4.502 – 5.396) and 5.357 seconds (4.628 – 6.087) respectively for female and male beneficiaries. The difference was not statistically significant. The mean duration of intradermal injection of vaccine was 9.504 seconds (95% CI: 9.239 – 9.769). For male recipients the mean duration was observed to be 9.657 seconds (95% CI: 9.338 – 9.976). Similarly for females it was 9.322 seconds (95% CI: 8.877 – 9.767). Again the difference of mean duration of injecting vaccine among the different genders was not different statistically.

Operational outcome of vaccination and the relationship with event-times:

Operationally complete / successful vaccination was observed in 79.84% of the beneficiaries. In the remaining 20.16% of the recipients the vaccination process was not operationally successful in case of injecting the vaccine in right or left arm. No beneficiary had unsuccessful blabbing over both the arms after ID administration of ARV. While among female recipients 22.03% had partially unsuccessful vaccination, among the males the proportion was 18.57%. The observed proportions did not statistically differ sex-wise.

Figure 2 depicts the confidence interval bars for the mean durations of grabbing the skin-stretch among the vaccine recipients. Among the female beneficiaries those who had successful vaccination (appearance of blabbing), the mean duration of skin-stretch was 5.043 seconds (95% CI: 4.498 – 5.589) compared to those with partially successful vaccination having the duration of 4.615 seconds (95% CI: 3.895 – 5.336). Among the males, the mean duration for skin-stretch was observed 4.154 seconds (95% CI: 3.557 – 4.750) among those who had partially successful vaccination and 5.631 seconds (95% CI: 4.755 – 6.508) among successfully vaccinated. The higher duration for grabbing the skin stretch for those having successful vaccination was statistically true for the male recipients but not in females. On overall analysis this hypothesis of difference in duration of skin-stretch in operational success was rejected.

The confidence interval bars in Figure 3 represents the mean durations in injecting the ARV and compares them gender-wise dependent on the operational outcome. While comparing the time taken for injecting ARV intradermally, the males who received successful vaccination documented a mean duration of 9.833 seconds (95% CI: 9.533 – 10.134) but for partially successful vaccination it was 8.885 seconds (7.746 – 10.022). Amongst the females the mean durations were respectively 9.696 seconds (95% CI: 9.208 – 10.183) and 8.000 seconds (95% CI: 7.250 – 8.750). Overall the difference in mean duration taken for vaccination was statistically significantly different

between successfully and partially successfully vaccinated beneficiaries with the duration higher for those with successful/ complete vaccination. While this observation did not hold true among the males, amongst females the duration of injection was statistically higher for those who had successful vaccination.

Table 1. Distribution of event-times among different genders.

Events in ID ARV administration	Female (n=59) Mean Duration (in seconds) (95% Confidence Interval)	Male (n=70) Mean Duration (in seconds) (95% Confidence Interval)	Overall (n=129) Mean Duration (in seconds) (95% Confidence Interval)
Preparation of vaccine	11.542 (11.189 – 11.896)	11.271 (10.971 – 11.572)	11.395 (11.168 – 11.623)
Drawing the vaccine into the syringe	18.441 (17.321 – 19.560)	23.443 (22.279 – 24.606)	21.155 (20.242 – 22.068)
Stretching of skin over the area of injection	4.949 (4.502 – 5.396)	5.357 (4.628 – 6.087)	5.171 (4.729 – 5.612)
Intradermal injection	9.322 (8.877 – 9.767)	9.657 (9.338 – 9.976)	9.504 (9.239 – 9.769)

Figure 2. Outcome-wise difference in mean duration for grabbing skin stretch among different genders.

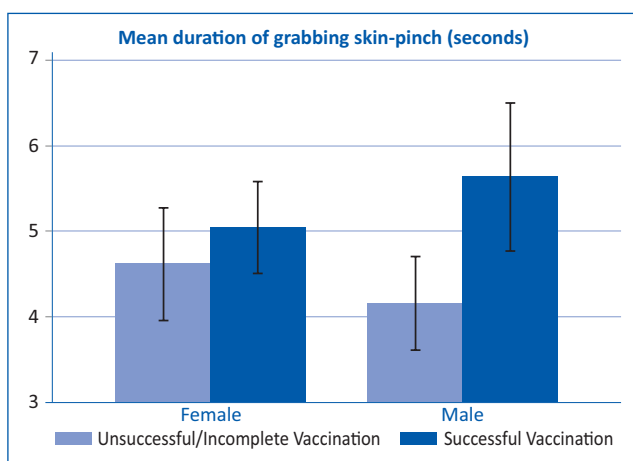
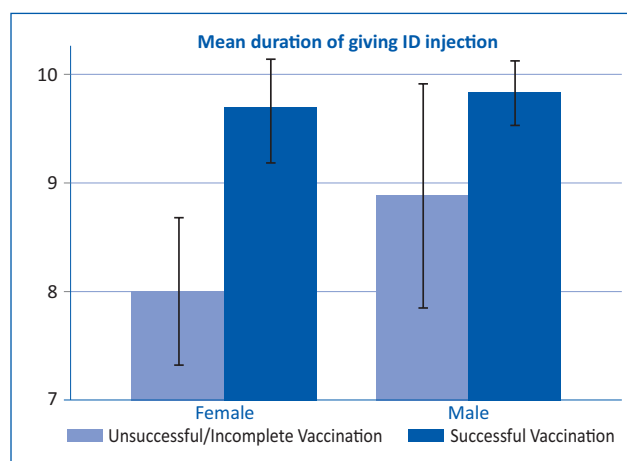


Figure 3: Outcome-wise difference in mean duration for injecting ARV among different genders



DISCUSSION:

Analysis from the current study revealed that shorter time given in skin-stretch and injecting was related to unsuccessful vaccination. However, there is need for developing an optimum time framework for vaccination events in this regard. The WHO has emphasized on training of manpower to achieve successful vaccine delivery through intra-dermal route and making every dose count.¹⁸ The question still looms large is regarding the trade-off between accuracy of vaccination and the minimum time spent for the process. It is enforced that for effective vaccination the full dose (0.1 ml) should be given intra-dermally.¹⁷ However, the dose increases if the route is not intra-dermal. Hence the issue of incomplete immune reaction if administration of vaccine is not intra-dermal properly. Laurent et al.¹⁹ in their study observed improper vaccination practice leads to poor clinical performance. This is a matter of concern since the global aim to reach “zero by 2030” depends much on the methodological accuracy. Skill-training regarding stretching of skin properly for ID injections appears to be an aspect for supportive supervision to improve the skills involved. Laurent et al.¹⁹ recommended new delivery system like microinjection system can be considered to overcome skill-gap. The current study was conducted with a lower power due to

resource constraints, but definitely paves way for future large-scale time-studies in this regard. While steps of the process are enumerated under standard operating procedure¹⁶, the technical aspects need to be standardized further to aim for even more objective skill-training. Time is one aspect of standardization. Motion studies conducted on the process will help in identified the important sub-events and thereby ensuring robustness of the guidelines. While recommendation regarding rigid time duration for the events may not be apt based solely on the study, but it can be safely said that longer duration given in the key steps ensures successful delivery of the vaccine.

The process of ID injection should be completed without any hurry to ensure proper dosing. In order to decrease the wastage of vaccine and making operationally successful vaccination training of the personnel associated should be undertaken periodically. Injecting ARV carefully and skill-fully may not only improve the service delivery, conceptually it will also result in a better patient compliance. As an alternative to the manual skill-based approach, mechanical intra-dermal vaccine delivery systems can be considered for this purpose which in fact requires further research.

KEY MESSAGE:

The process of intra-dermal injection should be completed without any hurry to ensure proper dosing. In order to decrease the wastage of vaccine and making operationally successful vaccination training of the personnel associated should be undertaken periodically. Injecting ARV carefully and skill-fully may not only improve the service delivery, conceptually it will also result in a better patient compliance.

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CONFLICT OF INTEREST: None declared.

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SPECIAL ARTICLE

Failure of Post-Exposure Treatment in Rabies Prophylaxis: Probable Cause

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Abstract

Introduction – Rabies is one of the ancient zoonotic diseases which is still a major health problem in India. Despite of availability of high potent modern tissue culture vaccine and most effective immunoglobulins, the disease still responsible for at least more than 12,700 of valuable human lives. As rabies do not allow the second chance to treat, the treatment protocol has to be very methodical, should be accurate and WHO guidelines and national guidelines to be followed strictly. In spite of following usual treatment in anti-rabies clinic, some cases of failure during the course of treatment have been observed. **Objective** – The main objective of this article is to pointing out the possible causes of failures, finding out the root cause and possible solution to this important aspect of management has been highlighted with determining causes and probable scientific based solutions. **Methodology** – Few cases reports from June 2009 to January 2019 with exclusion of Category I bites has been taken for studies. The place of study was conducted in New Delhi and Kolkata. **Results** – Mostly patients were children i.e. 60% belongs to age group between 15 years and 40% belongs to age group of 16 years and above. Incubation period was noted from 10 days to 7 months. Incubation period of one patient was recorded after 20 years as the virus was in dormant stage. **Conclusion** – The treatment protocol has to be very methodical following WHO and National guidelines along with APCRI recommendations for preventing treatment relating failures which is a most important aspect from treatment point of view.

Introduction:

M.V.I.D. Hospital, Delhi is the only specialized hospital for Rabies in whole NCR providing the management and isolation facilities of Rabies patients. The patients are referred to this hospital from all hospitals of Delhi and from neighboring states like U.P., Haryana, Uttarakhand etc. The overall situation of human Rabies has not changed over the past 10 years. An average 80 to 100 cases of fatal human rabies reported every year and admitted at MVID Hospital Delhi. In these cases, the victims generally did not receive prophylaxis. Approx. 30% cases had a history of partial vaccination or complete vaccination without RIG; and about 2% with RIG. Some cases also observed in Kolkata, West Bengal reported from 2009 to 2019 (January).

Objective:

To identify the reasons for death after Post-Exposure treatment. To ascertain the details of exposure site, severity of wound, risk of exposure and Post Exposure Prophylaxis.

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Materials and methods:

There was a long term study from 2009 to 2019 regarding the post exposure treatment failures. Eliciting the cause of failures despite of administering vaccine, pointing upon the possible causes and its implementation of the recommendation to prevent the cases of failures and to establish a proper guidelines particularly in case of severe category III bite. All category II and III cases are included in this series and category I cases are not included in the study. The results are distributed in tables and finally a thorough discussion has been done and conclusions were made followed by proposed recommendations.

Case 1:

History: A 5 years old male child from Okhala, Delhi admitted at I. D. Hospital on 10th Jan 2009 (after 20 days of exposure) with C/o Hydrophobia and expired on 11th Jan 2009. Patient was bitten by street dog on 21st Dec. 2008 at right hand with bleeding and reported to SJH. It was a category III Exposure. Wound toilet was not properly done.

Treatment given after bite: At SJH Rabies immunoglobulin was given after test dose and patient was advised for ARV treatment. Patient received 4 doses of ARV on D0, D3, D7, D14 & 5th dose (D28) was due. Dog was untraceable. IM dose was administered.

Probable Cause: Inadequate wound toilet. RIG not infiltrated in all wounds. 50% RIG misused on IM administration.

Case 2:

Subhajit Mondal, a boy of 4 years from Rajarhat area, Kolkata was bitten on face and left chest wall on 25th June 2009 by a suspected rabid dog which was untraced. He was reported to Pasteur Institute on 26th June, 2009 for **treatment** and advised to take rabid immunoglobulin and intradermal rabies vaccination on 26.6.09, 29.6.09 and 3.7.09. His body weight was 13 kg and received 520 IU ERIG locally. He ultimately developed high fever from 3.7.09, preceded by hydrophobia from 4.7.09 for which attended ID Hospital on 5.7.09 and expired on 6.7.09 in the morning.

Probable cause: high viral load, no wound toilet, immune status not ascertained.

Case 3:

An 8 years old female from Jatipur, Delhi was admitted at ID Hospital on 8.6.10. After 15 days of exposure with complaining of hydrophobia for 1 day. She was bitten by a stray dog on 23rd May, 2010 at left side of face and reported to RML Hospital on 24th May, 2010. The dog had bitten 8-9 persons but fate is not known.

Treatment given after bite at RML Hospital, rabies immunoglobulin given and advised for ARV. Patient received 4 doses of ARB on Day, 0, 3, 7 and 14 and 5th dose was due.

Probable cause: Suspected rabid dog bite, immune status not known, received RIG and ARV 4 doses IDRV or IM. Wound toilet was delayed and inadequate. Faulty technique in administering RIG and vaccine may be responsible in management. Proper history not received. Other causes should come for consideration.

Case 4:

History: 3 years old female from Pushpa Vihar, Delhi admitted at I.D. Hospital on 19th Nov 2011 (after 14 days of exposure) with C/o Hydrophobia, irritability x 3 day and expired on next day. She was bitten by street dog on 5th Nov 2011 in upper lip, face and scalp. It was Category III bite and reported to Pt. Madan Mohan Malaviya Hospital.

Treatment: At PMMMMH one dose IM –ARV was given & referred to SJH for ARS. At SJH as per body weight i.e. 11 kg ARS: 0.8 ml was given deep in gluteal region and rest 0.5 ml to be infiltrated around the wound and advice was given for ARV. Patient received 4 doses of ARV on D0, D3, D7, D14 & 5th dose (D28) due.

Dog was killed.

Probable Cause: Suspected Rabid dog bite, immune status not known, received RIG & ARV 4 doses, wound toilet was delayed and inadequate. Faulty technique in administering in RIG and vaccine. Other causes fate not ascertained.

Case 5:

History: 52 years male admitted at I.D. Hospital, Delhi on 28th Dec 2011 (after 7 months of exposure) with C/o Hydrophobia, Aerophobia x 1 days. He was bitten by street dog on 19th May 2011 at dorsum of left hand and reported to Rao Tula Ram Hospital.

Treatment: At RTRH Inj. TT and ARV (D0) were given and referred to higher Centre for ARS. Patient reported to SJH on 20th May 2011. Rabies immunoglobulin was given with advice for loose suturing after 24 hours.

Rest dose of ARV taken from RTR Hospital (**D3:** 22.05.2011. **D7:**26.05.2011. **D28:**16.06.2011.)

Dog was untraced.

Probable Causes: Bite on 19th May, 2011 by stray dog on dorsum of left hand with a category III bite. Received rabies Immunoglobulin and ARV total 4 doses. The last dose was on 16.6.2011. All were IDRV doses. 50% RIG was administered in gluteal region. Patient was also treated with loose stitching in bite area after 24 hours. Again pointing towards variable and long incubation period of initial management that was poor. The stitched area may not properly infiltrated with RIG. Multiple prick during infiltration indicating opening of many ports for viral entry. A small transdermal puncture wound may have been missed and not irrigated, disinfected and injected with RIG.

Case 6:

History: 4 years old male from Moti bagh, Delhi referred from SJH & admitted at I.D. Hospital on 15th Aug 2012 (after 20 days of exposure) with C/o Hydrophobia x 3 day and expired on 18th Aug 2012. He was bitten by street dog on 27th July 2012 on right side of face. Category III bite and reported to SJH.

Dog was killed.

Treatment given after bite: At SJH Rabies immunoglobulin was given after test dose on same day and advice for ARV. Patient received 4 doses of ARV on D0, D3, D7, D14 & 5th dose (D28) due. Wound was sutured and dressed after RIG. Antibiotic and pain killer advised.

Probable cause: Treatment received with 4 doses of ARV and 5th dose was due (D28). Suturing of wound with inadequate wound toilet and faulty technique in administering RIG may be the cause.

Case 7:

A patient Bignaraj Paul, 26 years male admitted on 27.8.09 in Jehangir Hospital, Pune. Hospital registration no. was 357733 with history of irrelevant behaviour but mentally alert with hydrophobia for 1-2 days. He had a history of dog bite about 20 years back. He had history of long standing cough since 6.8.09 and reached Pune from Orissa on 7.8.09 following loose motion since 20.8.09, which ultimately stopped and developed itching and backache with muscle weakness particularly with the lower limbs and finally expired on 29.8.09 at 1 pm. His brain samples were sent to NIMHANS, Bangalore which confirmed presence of negribodies in the brain. For the past dog bite since he received ARV only 3 doses in different days.

Probable Cause: Virus may be in the dormant stage for long time and the incubation period is variable. Condition of biting dog was not known. Standard protocol was not maintained. Cause of death due to rabies.

Case 8:

History: A 05 years male child referred from PGIMS, Rohtak and admitted at I.D. Hospital, Delhi on 12 July 2013 (after 20 days) with C/o Hydrophobia, Aerophobia x 3 days and expired on 13 July 2013. He was bitten by street dog on 22 June 2013 on scalp and reported to PGIMS Rohtak within 2 hours of bite.

Dog was Untraced.

Treatment given after dog bite: weight: 12.86 kg. ERIG 250 IU IM stat & 250 IU were infiltrated in and around the wound at PGIMS Rohtak. Referred to Surgery for Stitch & wound management.

Antibiotics and pain killer Inj. ARV taken from General Hospital Jind on D0(22/6), D3(25/6), D7(29/6), D14(5/7) & D28 due on 20.06.13.

Patient received 4 dose of ARV on D0, D3, D7, D14.

Probable Cause: Inadequate wound toilet, stitching of the wound after RIG administration may be faulty technique, bite in the dangerous zone (face). Viral load may be was high. Height also important for transmission of virus which reached the brain earlier.

Case 9:

History: A 62 years male from Madhya Pradesh, referred from SJH and admitted at I.D.Hospital, Delhi on 31st Dec 2013 (After 35 days of bite) with C/o Hydrophobia & Aerophobia x 2 days and LAMA on same day. He was bitten by Hyena / wild animal on 26th Nov 2013 at both forearm and both legs. Bite mark was present. One another person was also bitten by the same animal. At present that person had no abnormality detected.

Treatment given after bite: Dressing of the wound was done after cleaning on same day. Inj. ARS & 5 dose of ARV were given as per schedule. Last injection was given on 24.12.2018. Documents were not available at the time of admission.

Probable causes: Wound toilet was inadequate, but another person was not affected. Due to increased viral load in the first subject / immune status also may be less with faulty technique of ARS infiltration and patient bitten by a highly rabid animal Hyena.

Case 10:

History: A 22 years male referred from SJH and admitted at I.D.Hospital Delhi on 02 Feb 2017 (after 16 days of bite) with C/o Hydrophobia x 3 days and expired on same day. He was bitten by a street dog on 18 Jan 2017 on face (multiple wounds) and reported to Govt. Medical College at Gwalior.

Dog was killed.

Treatment given after bite: weight: 62 kg. Inj T.T. RIG 8.3 ml infiltrated in & around the wound. ARV taken on D0(18/1), D3(21/1), D7(25/1), D14(1/2). D28 was due on 5.02.17. Wound was sutured and dressed after RIG. Antibiotic and pain killer advised.

Probable Cause: stitching of wound, inadequate wound toilet, bite in dangerous zone of the face. RIG may not be properly administered in all wounds with high viral load, patient although received D14 dose of vaccination.

Results

Table 1: Age wise distribution of patient

Age group	No. of Rabies Cases	Percentage
Upto 15 years	6	60%
16 years and above	4	40%

Table 2: Incubation period of PEP failure cases

Period	No. of Rabies Cases	Percentage
Up to 10 days	1	10%
11 days to 20 days	4	40%
21 days to 30 days	2	20%
>1 to 3 month	1	10%
7 month	1	10%
20 years	1	10%

Table 3: Site of Bite

Site of Bite	No. of Rabies Cases	Percentage
Face	5	50%
Upper limb	1	10%
Lower limb	1	10%
Hand	2	20%
Both Legs	1	10%

Table 4: Treatment history after Exposure

ARV + RIG	No. of Rabies Cases	Percentage
3 doses	1	10%
4 doses	9	90%

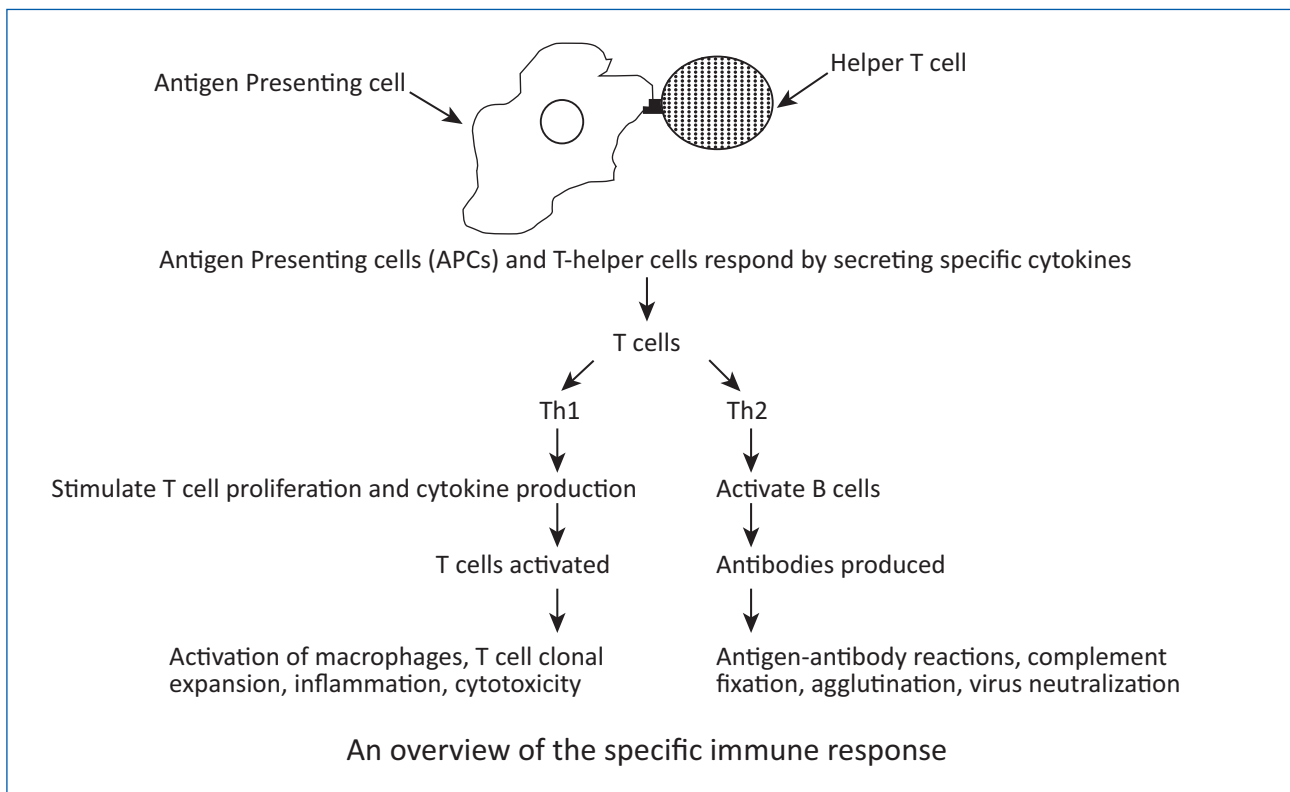
Table 5: Fate of Animal

Animals	No. of Rabies Cases	Percentage
Untraced	4	40%
Not known	4	40%
Killed	2	20%

Discussion:

Considering the failures reported in their article seems to be due to insufficient reactions due to primary response or secondary response. The IgG, IgM antibody detection was not done, due to lack of facilities. It is assumed that, possibly due to poor or no immune response, the patient has not developed adequate primary and secondary immune response. The post exposure treatment failure may be an important factor. Moreover host immune response may not be achieved and immunity was incomplete. Quality and control has to be maintained.

These data were not available during these cases. The viral antigen is mainly proteins or glycoproteins and this is a fact, the immune response to viral antigen is mainly T-cell dependent. The diagnosis in all cases is based on clinical findings only



Ref: *Immunology, Darla J Wise and Gordon R Carter, 1st Edition, Iowa State University Press, 2004.*

Failure during post exposure treatment or following PET is being reported since long time. Most of the cases are not even reported. These cases mentioned above, have been included in the studies. In most of the cases, the treatment protocol has seen some deviations or not technically and scientifically followed.

Viral Load: The possibility of excessive Viral Load during Exposure plays a major role in these cases. In some cases, the authors showed eagerness to point out the fact of high viral load during some of the exposures. Practically it has been observed in some cases that the first bite victim has developed rabies but the rest were not affected even after taking vaccines after 2 months of time. Two patients have reported in Kolkata from Afghanistan for vaccination after 2 months of exposure (Jamile & Rijaul), where the elder brother who was the first bite victim has developed rabies within few days after bite. Here, Subhajit Mondal, a child has developed rabies within 7 days after exposure in face and anterior chest wall. In spite of administration of RIG and 3 doses of IDRV vaccine soon after 12 hours of bite, in June 2010, after 15 days of exposure, an 8 years old female has also developed rabies (in face) after suspected rabid dog bite. Although the fate of the rest 8-9 persons were not known. There is no method till now by which the viral load can be assessed.

Viral load cannot be assessed as it is neurotrophic virus and not present in the blood.

Wound Wash: The role of wound wash establishes its efficacy as a mandatory initiating procedure. Proper and repeated wound wash with soap and water, under running tap water, has got immense values because the chance of developing rabies seems to be reduced at least 40% to 50%. To be very particular, each wound has to be washed with detergent soap for at least 15 minutes and it has to be established as standard protocol. If a patient is having multiple wounds and in multiple sites, then each site of the different parts of the body will take a lot of time to achieve the goal. The soap is the only media which can wash the outer shell of the glycoprotein, which is responsible for viral attachment. Other application of any other material has got no role except povidone iodine preferably 5% to 10% which is considered as a virucidal agent. Any other application locally like acids etc. causes

development of local burn injury which results more damage of local nerve endings leading to more virus entry very rapidly. Usually the classical protocols in these cases are not possibly maintained. Most of the bites are of category III and especially in the face which is considered as danger zone and more closer to the central nervous system. The wounds, particularly in the face, head, hands, genitalia which is a richly innervated area comes again as a danger zone and the wounds more closure to the central nervous system, directly related with the rate of transmission of virus with a maximum speed per day in the shorter time, which indicates that chance of developing rabies highly increases. These wounds have to be given special care to minimize the chance of treatment related failures.

RIG Application: In the second phase, where RIG application is necessary should be infiltrated as soon as wound wash is completed. RIG infiltrations should be more methodical, scientific and technically accurate. The main objective is that, it neutralizes the virus at the site of entry. To achieve the best results, it should be done immediately after the wound toilet.

There is no role of RIG infiltration intramuscularly because it is a neuro tropic virus and no virus sets in the muscles far away from bite site. If no virus is there, the IM administration is considered as simply misuse and increases the chance of antigen antibody reaction. With this concept, both the authors have never injected rabies immunoglobulin intramuscularly. The correct method of RIG administration is infiltration in the wounds with a minimum prick because multiple prick increases chances of more viral entry through these ports. It should be assured simultaneously that each site has to be infiltrated 100% without leaving a single wound untouched. In the above mentioned few cases, three were reported in primary closure of wound after RIG infiltration. It is practically difficult to access the accuracy of RIG infiltration. The primary closure of wounds with stitches invites creating many viral ports and accumulation of collection inside the wound itself which cannot come outside and increases the risk of viral transmission. This viral transmission rapidly increases the chance of development of rabies and the antibody production is becoming delayed and risky. During RIG application, it should be approached through the base of the wound and it should be kept in the mind that the RIG infiltration will help usually upto day 7 only. These are all included as a part of passive immunization. Delay in administering RIG is also an attributing/ aggravating factor. The RIG infiltration has to be very methodical so that not a single small point in a transdermal wound would be missed during the course of infiltration. The ideal and safe aspect of suturing the wound should take at least 2 weeks of time and the wounds with non infiltration with RIG, should be sutured until it heals from wound or may be attempted for suture if the antibody level reaches its protective value / reaching 100% of seroconversion value.

IDRV procedure: The next important aspect is active immunization which also should be started after RIG administration, taking at least one hour time later, because of avoidance of immediate antibody and antigen reaction.

In case of Subhajit Mondal, possibility of failure in IDRV technique may be inaccurate. There are still chances of Subcutaneous administration in place of Intradermal vaccine administration.

In 60% of patients, the first symptoms were observed within 20 days of exposure and this short incubation may be explained by the severe bite on the face, head and hand which are richly innervated area. All cases present with hydrophobia, with features of a 'furious' form, these features made the diagnosis of rabies easy. In all cases, PEP was started as per usual standard guidelines. No case report for development of paralytic form of rabies was reported.

All the patients received first (D0), second (D3) & third (D7) dose of rabies vaccine in deltoid region. RIG was infiltrated in and around the wound and the rest intramuscularly. In 3 cases, the bite wound was sutured on the same day after RIG infiltration. All cases appeared to have received PEP timely and appropriately, yet died of rabies.

Conclusion:

From the above discussion it can be said that most common probable causes for the failure of PEP were - washing of the wound was not done with soap and water, the wound on the face and hand which are zones richly innervated may be explaining the failure in prophylaxis, delay in RIG infiltration, RIG was infiltrated ½ in the wound and rest ½ in gluteal region, wounds sutured on the same day after RIG infiltration, errors in management and a small transdermal puncture wound may have been missed and possibly not irrigated properly and not injected with RIG, inappropriate intradermal vaccination specially in children is also a great factor.

Two cases of reported late incubation period i.e. one case of 7 months and another was 20 years. In these cases Rabies virus was present in dormant stage.

Death in rabies is inevitable. A current treatment protocol which has been proposed aims only preventive aspect. The quality of vaccine has to be assessed properly and special emphasis has to be given for maintenance of cold chain in the vaccine and rabies immunoglobulin storage. The development of much more immunogenic vaccine and rabies immunoglobulin are required. The quality of vaccine has to be maintained. Only then we can dream for dog mediated rabies free India by 2030. We should have a definite vision to convert the dream into reality. It is the high time to detect underlying cause and to adopt pre exposure prophylaxis by which a definitive role can be played and author's recommendation is also to incorporate in national immunization schedule for pre exposure prophylaxis.

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SPECIAL ARTICLE

Clinical Safety of Rabies Monoclonal Antibodies: A Follow up study conducted at ARC, VIMSAR, Burla

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Abstract

Background - As ERIG was not available in The Anti-Rabies Clinic of VSS Institute of Medical Science & Research, Burla, Sambalpur, Odisha in November 2017, patients were counselled regarding R'Mab (Rabies Monoclonal Antibodies), which is available in Indian Market recently and was prescribed to patients with category III animal bite to study its clinical safety. **Objective** - To study the clinical safety of injection R'Mab. **Methods** - A prospective follow up study on 53 cases having Category III animal bite, who were able to purchase R'Mab available in Market were administered at Anti-Rabies Clinic, Dept. of Community Medicine, Veer Surendra Sai Institute of Medical Science & research, Burla, Sambalpur, Odisha, India and these cases were followed of for both local & systemic side effects on Day 3, 7, 14, 28, 45, 60, 90, 180 from December 2017 to August 2018. **Results** - 62.2% were Male and 54.3% were children. Out of the total 53 animal bite cases, 72% were due to dog bite and rest 38% were due to Monkey bite, Cat bite, and Pig bite respectively. Most of the bites are in lower limb (35.8%) followed by upperlimb (20.7%). Only 6 persons (11.32%) complained about local pain at the site of R'Mab administration whereas 2 (3.77%) persons presented with local site induration on day 3. Most common Systemic side effects were malaise & fever which was observed in only 2 cases (3.77%) as on Day 3. No serious side effect like anaphylaxis was present. **Conclusion** - Out of 53 patients administered R'Mab only 15.09% shows local adverse effects whereas only 3% complained of systemic effects like malaise & fever which decreases with progress of time without any additional medication and no side effects (local and systemic) were reported after 7th followed up days.

Key words - Rabies, Rabies Monoclonal Antibody (R'Mab), Adverse Reaction, Safety

Introduction

Rabies, a zoonotic viral infection commonly transmitted by saliva through the bite of an infected animal, is a fatal disease to humans if not treated immediately.¹ Each year, it is estimated that at least 60,000 people die from rabies and more than 10,000,000 receive post-exposure vaccination against rabies.² The World Health Organization (WHO) recommends post-exposure prophylaxis (PEP) for different categories of animal bite or non-

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bite exposures which consist of a combination of wound cleaning, active immunization with a tissue culture rabies vaccine and passive immunization with Immunoglobulin. Three classes of biological product are available for passive immunization: human rabies immunoglobulin, equine rabies immunoglobulin and Rabies Monoclonal Antibody. WHO has recommended use of MAb “cocktails” containing at least two antibodies against RABV, as alternatives for RIGs in PEP3. Several human MABs have been tested against rabies. The first (a single MAB) was recently licensed by the Serum Institute of India⁴. Studies so far show the equivalence of its performance to human RIG. The availability of this MAB could fill critical public health gaps. As it is made by recombinant technology, it will be less prone to problems such as availability, safety and purity. It should be recommended for use in public health programmes, depending on the epidemiological and geographical setting, with monitoring of its safety and efficacy (clinical outcomes) during post-marketing use. Thus, the aim of this study is to evaluate the clinical safety of Rabies Monoclonal antibody (R’Mab) alternative to RIG, so that access to appropriate treatment in the India can be improved.

Objective

To study the Clinical safety of Injection Rabies Monoclonal Antibody

Material & Methods

It was a prospective observational study done from December 2017-August 2018 at the Anti Rabies clinic (ARC) Of Department of Community Medicine, at VSS Institute of Medical Science & Research, Burla, Sambalpur, Odisha. All the patients having category III animal bite were counselled regarding ERIG, HRIG & R’Mab. As R’Mab was not supplied by government and keeping in mind the cost factor only 53 out of 687 patients (Enrolled Category III patients from December 2017 to February 2018) agreed to purchase R’Mab and gave written consent to participate in the study. Amount of Inj.R’Mab required was calculated as 3.3 IU/Kg body weight. The volume of R’Mab injected locally depended upon the site of bite and rest was administered intramuscularly on anterolateral aspect of thigh. Simultaneous active immunisation with modern cell culture vaccines was also administered. The patients were then followed up regarding local & systemic side effects during their subsequent visit at ARC OPD for active immunisation. After completion of vaccine course that is after 28 days patients were telephonically followed up on Day 45, 60, 90, 180 regarding any side effects.

Results

Table 1: Age & Sex wise distribution of patients

Age	Male		Female		Total
	N	%	N	%	N(%)
< 18 yrs	18	34	11	20.7	29(54.3)
> 18 yrs	15	28.2	9	17.1	24(45.7)
Total	33	62.2	20	37.8	53(100)

Total 53 patients with Category III animal bite were give consent to participate in the study. Out of which 29 (54.3%) were <18 yrs. of age and rest 24(45.7%) were above 18 yrs. of age. 33 (62.2%) out of total 53 were male and rest 20(37.8%) were female. Male and female children constitute 18(34%), 11(20.7%) of total study population respectively.

Table 2: Distribution of Site of Bite

Site	Number	Percentage
Upper Limb	11	20.7
Lower Limb	19	35.8
Trunk	6	11.3
Head & Neck	9	17
Multiple Sites	8	15.2
Total	53	100

Highest number i.e. 19(35.8%) of bite reported in the lower extremities followed by 11(20.7%) in the upper extremities. 9(17%) cases presented with bite over face & head. 8(15.2%) cases presented with bites over multiple site who were most commonly children.

Table 3: Type of Animal Bite

Type of Animal	Number	Percentage
Dog	38	71.70%
Monkey	8	15.09%
Cat	5	9.43%
Pig	2	3.77%
Total	53	100

Whereas 38(71.7%) of the cases reported were dog bite cases, monkey bite, cat bite and pig bite cases were 8(15.09%), 5(9.43%) and 2(3.77%) respectively.

Table 4: Local reaction after administration of Injection R'Mab(Day wise)

Adverse Reaction	Day 0	Day 3	Day 7	Day 14	Day 28	Day 45	Day 60	Day 90	Day 180
Local Edema & Induration	0	2(3.7%)	0	0	0	0	0	0	0
Local Pruritus	0	0	0	0	0	0	0	0	0
Local Pain	0	6 (11.32%)	0	0	0	0	0	0	0

Out of 53 cases, 2(3.7%) cases were presented with local edema & induration on day 3 which subsided naturally without any medication. 6(11.32%) cases had complained of pain at the site of R'Mab administration on day 3 which was relieved by taking analgesic. None of the person received R'Mab complained about any local side effects like edema, induration, pruritus, pain at the site of R'Mab administration on Day 7, 14, 28, 45, 60, 90, 180.

Table 5 : Systemic reaction after administration of Injection R'Mab (Day wise)

Adverse Reaction	Day 0	Day 3	Day 7	Day 14	Day 28	Day 45	Day 60	Day 90	Day 180
Generalised Pruritus	0	0	0	0	0	0	0	0	0
Fever& Malaise	0	2 (3.77%)	0	0	0	0	0	0	0
Rashes	0	0	0	0	0	0	0	0	0

Fever more than 390C & Malaise were reported by 2(3.77%) case on Day 3. None of the cases reported rashes at the site of R'Mab administration or at any other sites. No systemic reaction reported on Day 7, 14, 28, 45, 60, 90, 180.

Discussion

The WHO Guidelines define category 3 exposure as single or multiple transdermal bite/scratches and the patient should receive both passive and active immunization. More and more international manufacturers are discontinuing ERIG production and Human RIG is available in confidential quantities on specific markets and is too expensive for most people. Monoclonal antibodies (MAbs) capable of neutralizing a diverse range of rabies isolates could offer a solution to address the cost, supply and safety issues associated with blood derived Rabies Immunoglobulin (RIG). The advantages of human MAbs are minimal allogenetic reactions; better compartmentalisation; longer in vivo half-life; improved ability to interact with human Fc receptors.

The present study conducted in 53 cases of whom 72% were dog bite and 35.8% of cases presented with bite over lower limb. The amount of R'Mab administered, as per the calculated body weight (3.3IU/Kg body weight) as much as anatomically feasible and rest were injected over thigh. In a study done by **Kaware a et al**⁵, dog was the most common (93%) biting animal and 44.35% bites were on the lower limb which were similar to our study.

In our present study local pain, edema at the site of R'MAB administration and induration was present in 11.32% and 3.77% of patients respectively, whereas local pain, induration and edema were observed in 95.8% of cases on day of ERIG administration followed by pruritus in a study by **Behera T R et al**⁶. In another study by **Verma R K et al**⁷ local swelling was found in as high as 41.5% of the subjects. In the present study all these side effects gradually decrease and no local side effect reported on day 7, 14, 28, 45, 60, 90, 180.

Systemic reaction like malaise & fever was present in 3.77% of cases which were relieved after taking analgesic (T. Paracetamol). In a study by **Behera T R et al**⁶, the systemic side effects of patients receiving ERIG like low grade fever and malaise were 42.86% and 49.77% respectively. These figures were much higher than our study.

Conclusion

The present study enlightens the scope of using the newly available Rabies Monoclonal antibody and can be used against ERIG or HRIG at an affordable cost in all Category III cases with minimal adverse events.

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ORIGINAL ARTICLE

PEP Seeking Behaviour In An Urban Poor Locality

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Abstract

Need for study: Animal bites to humans are a major public health problem in India; an estimated 17.4 million animal bites occur annually. It is more common in urban poor localities as there is a combination of large human and dog populations living in congested habitable areas. **Objectives:** 1. To assess the burden of animal exposures in the study area. 2. To know the characteristics of animal bites. 3. To describe the post exposure prophylaxis received by the animal bite victims. **Methodology:** A community based; cross sectional study was conducted in an urban poor locality, Yarab Nagar coming under field practice area of KIMS, Bangalore. A house to house survey was conducted and all the households were interviewed using a pretested, semi-structured proforma to collect information regarding history of animal exposures in last one year; if present, then a detailed history regarding the biting animal, circumstance of bite, practices after the bite, PEP received and completion of PEP was obtained. **Results:** A total of 6052 population were surveyed, among whom 67 animal bite cases were reported giving the prevalence rate of 1.1% in the study area. Majority of the bite victims were from the age group of 15-60 years (61.2%) and the common biting animal was dog (89.6%). Most of the bite injuries were abrasions (70.1%), mainly on the limbs (86.6%), 85.1% were category III exposures and 93.2% had washed their wounds. Among the exposed victims, only 53 (79.1%) sought PEP at the health care facility and 84.9% completed the full course of vaccination, but only 44.4% of the Category III exposures received RIG. **Conclusion:** Animal exposures are an important public health problem in urban poor locality; providing timely and complete PEP is essential to prevent rabies.

Key Words: animal exposures, post exposure prophylaxis, anti-rabies vaccine, rabies immunoglobulin, urban poor locality

Introduction:

Rabies is a neglected zoonotic disease that it is insufficiently addressed by the countries and the international communities, as the people and communities who are affected the most are poor living in remote rural areas

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and urban slums of the developing World.¹ The disease occurs in 150 countries and territories covering all the continents except Antarctica. The disease that is practically 100% fatal, poses a potential threat to over 3.3 billion people worldwide.² Animal bites mainly affects the underserved populations both rural and urban, and has been documented for more than 4000 years. Most cases occur in Africa and Asia, with approximately 40% of cases in children.^{3,4}

The magnitude and epidemiological pattern differs from country to country. It is a disease of poverty, affecting vulnerable population and children. In India, animal bites in humans are a major public health problem and an estimated 17.4 million animal bites occur annually.⁵ The disease is mainly transmitted by dogs, being responsible for 96% of animal bite cases; the dog population in India is estimated to be 25 million and a vast majority of them are not protected against rabies.⁶

In urban areas, animal exposures are more common in poor locality, as there is a combination of large human and dog populations living in congested habitable areas. Therefore, whenever there is any animal exposure that is suspected, probably or confirmed to be rabid or when there is doubt about the factors that led to the exposure, post exposure prophylaxis (PEP) should be initiated as early as possible.^{7,8} The post exposure prophylaxis consists of thorough wound washing with soap or detergent and water and virucidal agents to reduce the viral inoculum at the wound site; post-exposure anti rabies vaccination (ARV) to induce antibodies which lower the risk of virus entering peripheral nerves after a bite from a rabid animal and timely administration of rabies immunoglobulin (RIG)/ rabies monoclonal antibodies (R'Mab) in all category III exposures to neutralize the virus at the wound site.⁹

The present study was done to assess the burden of animal bites in an urban poor locality and the post exposure prophylaxis received by the exposed victims.

Objectives:

1. To assess the burden of animal exposures in the study area.
2. To know the characteristics of animal exposures.
3. To describe the post exposure prophylaxis received by the exposed victims.

Methodology:

The study was undertaken after taking the Institutional Ethical Committee clearance. A community based cross sectional study was conducted in an urban poor locality, Yarab Nagar coming under field practice area of Kempegowda Institute of Medical Sciences (KIMS), Bangalore from January to June, 2017. A house to house survey was conducted in 4 blocks and all the households were interviewed using a pretested, semi-structured proforma to collect information regarding history of animal exposures in the last one year. If the household reports any animal exposure in their family; then a detailed history regarding the biting animal, circumstance of bite, practices after the bite, health seeking behavior, post exposure prophylaxis received from the health care system and the completion of anti-rabies vaccination was obtained. All the data was entered in the excel sheet and analysed using mean and percentages.

Results: A total of 6,052 population was surveyed covering 1512 houses, among whom 67 animal bite cases were reported giving the prevalence rate of 1.1% in the study area. The socio-demographic profile of the exposed individuals is shown in Table1.

Table 1: Socio-demographic profile of the exposed individuals (n=67)

Socio-demographic profile		Number	Percentage
Age (in years)	< 15	22	32.8
	15-60	41	61.2
	> 60	04	6.0
Sex	Male	41	61.2
	Female	26	38.8
Literacy Status	Literate	60	89.6
	Illiterate	07	10.4
Socio-economic status (Modified Kuppuswamy's Classification)	Lower	55	82.1
	class	12	17.9
	Others	-	-

In the present study, majority of the bite victims were from 15-60 years (61.2%); followed by < 15 year old children (32.8%) and elderly (6.0%). Most of the bite victims were males (61.2%); literates (89.6%) and belonged to lower socio-economic status (82.1%) according to Modified Kuppuswamy's SES classification.

Table 2: Characteristics of exposures (n=67)

Characteristics of exposures			Number	Percentage
Biting animal	Dog	Pet (Owned)	20	29.8
		Stray(Unowned)	40	59.8
	Cat		03	4.5
	Monkey		03	4.5
	Cow		01	1.4
Circumstance of bite	Provoked		10	14.9
	Unprovoked		57	85.1
Vaccinationstatus of biting animal	Vaccinated		09	13.5
	Unvaccinated/ Don't know		58	86.5
Type of Exposure	Abrasion		47	70.2
	Laceration		08	11.9
	Punctured wound		12	17.9
Site of Exposure	Lower limb		40	59.8
	Upper limb		16	23.9
	Head, neck & face		09	13.5
	Trunk		02	2.8
Categorization of exposure	II		10	14.9
	III		57	85.1

The present study showed that, dog (89.6%) was the biting animals in most of the exposures, followed by cat (4.5%), monkey (4.5%) and cow (1.4%). Most of the exposures (85.1%) from these animals were unprovoked and the vaccination status of the 86.5% of the biting animals was either unvaccinated or unknown.

Among the bite victims, most of the injuries were abrasions (70.2%), lacerations (11.9%) and punctured wounds (17.9%). These exposures were mainly on the limbs (83.7%), followed by head, neck & face (13.5%) and trunk (2.8%). Majority of the exposures were category III (85.1%) in nature with transdermal bites. Among the 67 reported

exposed individuals, only 53(79.1%) sought post exposure prophylaxis at the health care facility; 45(84.9%) of them went to Government health sector and the remaining 8 (15.1%) went to private health care facility. Before going to health care facility; 42 (79.3%) had washed the wounds and all of them had applied some local antiseptics to the wound. 11(20.7%) of them had put irritants like turmeric, coffee powder and lime on the wound surface.

Table 3: Post exposure prophylaxis received by the exposed individuals (n=53)

Post Exposure Prophylaxis		Number	Percentage
Categorization of exposure	II	08	15.1
	III	45	84.9
Rabies Immunoglobulin (n =45)	Received (ERIG)	20	44.4
Anti-rabies vaccination	Started	53	100.0
	Completed full course	45	84.9

Among the exposed victims, who sought post exposure prophylaxis, 45(84.9%) had category III exposures. Rabies immunoglobulin was given only in the government hospital and 44.4% of the category III bites received rabies immunoglobulin. All the exposed individuals who went to health care facility had received the anti-rabies vaccination, but only 84.9% completed the full course of vaccination. The reasons for not completing the full course of vaccination by the exposed individuals were negligence, animal was alive & healthy, busy with other work and not affordable. All the exposed individuals were healthy and alive without any complications.

Discussion:

Rabies is a neglected zoonotic disease caused by the rabies virus of *Lyssavirus* genus, within the family Rhabdoviridae. The rabies virus (RABV) is transmitted to humans and other animals through close contact with saliva from infected animals. All mammals are susceptible to infection by the rabies virus; transmission of RABV by dogs is responsible for up to 99% of human rabies cases in rabies-endemic regions, with a small proportion being transmitted via wildlife (such as foxes, wolves, jackals, bats, racoons, skunks or mongoose).The virus is transmitted by the saliva of rabid animals and generally enters the body via infiltration of virus-laden saliva from a rabid animal to other animals and humans through bites, scratches, licks on broken skin and mucous membrane. Rabies is a vaccine-preventable disease and is most amenable to control, as the appropriate tools for prevention i.e., post exposure prophylaxis (PEP) are available. Therefore, it is the first zoonosis on the list of neglected diseases targeted by World Health Organization (WHO) for regional and eventually global elimination of dog-mediated human rabies from the world by 2030. The post exposure prophylaxis, such as thorough wound wash with prompt administration of cell culture vaccine and simultaneous administration of rabies immunoglobulin/ rabies monoclonal antibodies in all category III exposures, is almost invariably effective in preventing rabies, even after high risk exposure.

WHO-APCRI survey revealed that, majority (75%) of the animal bite victims belonged to low-income group and exposure among these populations makes it more difficult to prevent rabies unless access to good medical care is immediately available.¹ Present study in an urban poor locality showed that the prevalence of animal exposures was 1.1%; similarly, the nationwide multi-centric survey conducted by APCRI with technical and financial support from WHO showed that the incidence of animal exposures to be 1.7%.⁵ These studies showed that animal exposures are a substantial public health problem in India, because of uncontrolled stray dog population.

The present study also showed that majority of the bite victims were from 15-60 years (61.2%); followed by < 15 year old children (32.8%) and elderly (6.0%). Most of the bite victims were males (61.2%); literates (89.6%) and belonged to lower socio-economic status (82.1%).Similarly, a study conducted in Bangalore at an urban health training centre of a government medical college showed that most of the cases (64.4%) were adults followed

by 30.1% children less than 15 years of age and majority of the bite victims were male (72.4%).¹⁰ Another cross-sectional study conducted in a slum of Chennai showed that most of the cases (71.1%) were adults followed by 25.2% children less than 15 years of age and majority of the bite victims were male (58.5%) and 54.8% of them belonged to lower class.¹¹ All the studies showed that animal exposures are more common in the adults, who are of economically productive age group and children of school age and more common among lower class of people, who can least afford to the management cost.

The present study showed that, dog (89.6%) was the biting animal in most of the exposures, followed by cat (4.5%), monkey (4.5%) and cow (1.4%). Most of the exposures (85.1%) from these animals were unprovoked and the vaccination status of the 86.5% of the biting animals was either unvaccinated or unknown. Similarly, a study conducted at a government hospital in Bangalore showed that 96.7% of the exposures were from dogs, among whom 67.1% were stray dogs whose vaccination status was not known and most of them were unprovoked bites.¹² Another cross sectional study from Central India showed that 95.5% Of the exposures were because of dogs and 75.9% of them were unprovoked exposures and 78.6% of the biting animals were not able to observe/Escaped/Fate not known.¹³ All the studies showed that dog is the biting animal in majority of the cases and most of them were stray dogs whose vaccination status is not known and were not able to be observed/Escaped/Fate not known. Therefore, this warrants the risk of rabies exposure, which has to be managed by timely and complete post exposure prophylaxis to prevent rabies.

The present study also showed that among the 67 reported exposed individuals, only 53(79.1%) sought post exposure prophylaxis at the health care facility; 45(84.9%) of them went to Government health sector and the remaining 8 (15.1%) went to private health care facility. Before going to health care facility; 42 (79.3%) had washed the wounds and all of them had applied some local antiseptics to the wound. 11(20.7%) of them had put irritants like turmeric, coffee powder and lime on the wound surface. Another cross-sectional study from Surat showed that 67% washed with either water alone or with soap & water; 40% applied irritants like Chili powder, Lime and salt, Turmeric, Snuff etc.¹⁴

Another epidemiological study of animal bites among rural population in Tamil Nadu showed that 40% of the exposed individuals washed with soap and water, 34% used antiseptics and 26% used irritants like chilli powder, coffee powder, Kerosene, lime stone etc. It was found that majority (76.47%) went to Government hospital for treatment and another 23.53% went to private hospital for treatment.¹⁵ All the studies showed that most of the animal bite victims from either rural areas or from urban poor locality sought the post exposure prophylaxis from the government health sector.

In the present study 84.9% had category III exposures. Rabies immunoglobulin was given only in the government hospital and 44.4% of the category III bites received rabies immunoglobulin. All the exposed individuals who went to health care facility had received the anti-rabies vaccination, but only 84.9% completed the full course of vaccination. The reasons for not completing the full course of vaccination by the exposed individuals were negligence, animal was alive & healthy, busy with other work and not affordable. Similarly, a study conducted in the government hospital showed that, majority of the reported cases (70.8%) belonged to category III exposures. The compliance rate for full course of intradermal vaccination was 77%. The major constraints were loss of wages, forgotten dates, cost incurred, interference with working hours/school timings, and distance from the hospital.¹⁶ Another study from an anti- rabies clinic of Solapur showed that the compliance to full course of vaccination was only 41.6%.¹⁷ Another study from government tertiary care hospital in South Karnataka showed that most (82%) of the exposures were of category III. 29% of them had received RIG. 72% of the patients completed the full course of vaccination.¹⁸ All these studies showed that majority of the cases belonged to category III exposures and the compliance to complete course of vaccination was poor, as it is important to complete the full course of vaccination to get complete protection.

In conclusion, animal exposures are an important public health problem in urban poor locality; providing timely and complete PEP is essential to prevent rabies.

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ORIGINAL ARTICLE

Epidemiological profile of animal bite cases attending Primary Health Centre, Sanquelim for Rabies PEP

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Abstract

Introduction: Worldwide India is reported to have highest incidence of rabies². With 20565 deaths reported annually, most cases are reported from rural areas. The study was a felt need at Sanquelim Primary Health Centre as it is the only PHC covering rural population of Sanquelim and ARV prophylaxis is provided free of cost at this centre.

Objectives:

1. To study the demographic profile of the patients attending the PHC for ARV prophylaxis
2. To study the type of animal bites and their category wise distribution among them
3. To assess patient compliance for 5 dose intramuscular schedule of ARV.

Methodology: The present record based analytical study was carried conducted at Primary health centre Sanquelim for a period of 6 months from March 2015 – August 2015. **Results:** A total of 276 cases reported during the study period from March-August 2015 of which majority i.e. 197 (71.4%) were males. Out of the total animal bite cases, majority i.e. 236 (85.5%) were dog bites. Majority i.e. 178 (64.5%) of the bites were seen on lower limbs. It was noticed that only half i.e. 131 (47.50%) completed entire 5 dose IM Essen schedule of ARV. None of the patients received ID regimens of ARV.

Introduction

Rabies is an acute zoonotic disease of public health and economic importance in South-East Asia¹. Rabies is attributed to animal bite which is defined as claw wound or bite due to animal². Dog bites account for 93% - 96% of all animal bites in patients reporting to the health facilities for PEP¹.

99% of the human rabies cases are attributed to canine rabies³. Globally it is estimated that around 55000 people die due to rabies. An estimated 12 million people throughout Asia receive treatment after being exposed to animals that are suspected of rabies¹. Around 21000 - 24000 deaths due to rabies occur in South - East Asia region⁴.

Worldwide India is reported to have highest incidence of rabies⁵. With 20565 deaths reported annually, most cases are reported from rural areas. While the availability of PEP has improved, it is not clear how much the rural communities have benefitted⁶.

The study was a felt need at rural Primary Health Centre at Sanquelim, Goa as ARV prophylaxis is provided free of cost at the centre and covers the rural population of around 40000.

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Objectives

1. To study the demographic profile of the patients attending the PHC for ARV prophylaxis
2. To study the type of animal bites and their category wise distribution among them
3. To assess patient compliance for 5 dose intramuscular schedule of ARV

Methodology

Study design: Record based observational study

Study Area: Primary Health Centre, Sanquelim, North Goa which is the only Health centre in the rural area of Sanquelim where ARV is available free of cost

Study duration: 6 months (March 2015- August 2015)

Study population: All patients registered for ARV prophylaxis during the study period were included in the study
 Sampling: census method

Data Analysis: Data was entered into excel worksheet (2015), transferred and analysed using SPSS version 22

Ethical approval: IEC approval from local Institutional Ethics Committee, Goa Medical College and necessary permissions from DHS were obtained for the conduct of the study.

Results:

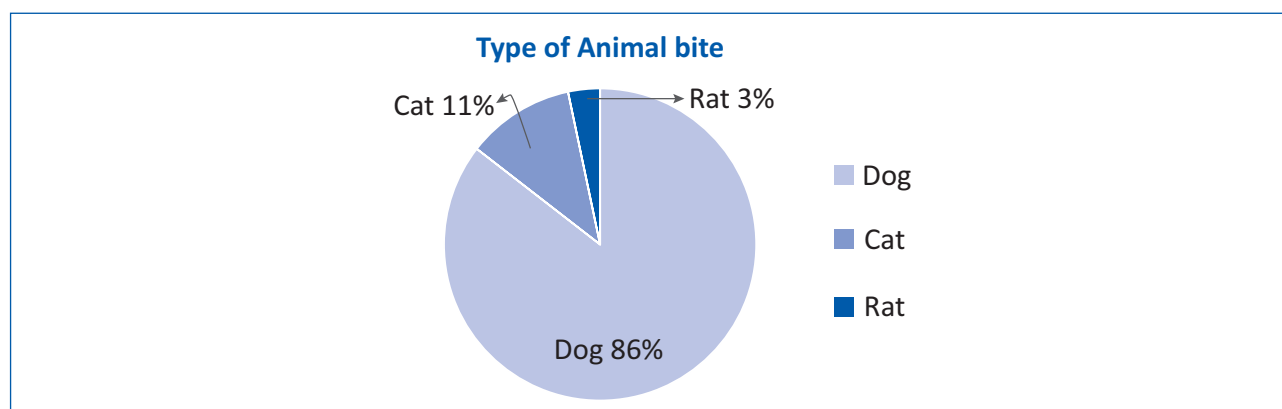
A total of 276 cases reported during the study period from March-August 2015. Majority i.e. 197 (71.4%) were males and 79 (28.6%) were females. Majority i.e. 151 (54.7%) of the study participants belonged to the age group of 15-45 years.

Table 1: Age and Sex distribution of patients with animal bites

Age group	Males(%)	Females(%)	Total(%)
0-5	20 (7.2%)	3 (1.1%)	23 (8.3%)
6-14	33 (12%)	12 (4.3%)	45 (16.3%)
15-45	108 (39.1%)	43 (15.6%)	151 (54.7%)
46-60	22 (8%)	10 (3.6%)	32 (11.6%)
>61	14 (5.1%)	11 (4%)	25 (9.1%)
	197 (71.4%)	79 (28.6%)	276 (100%)

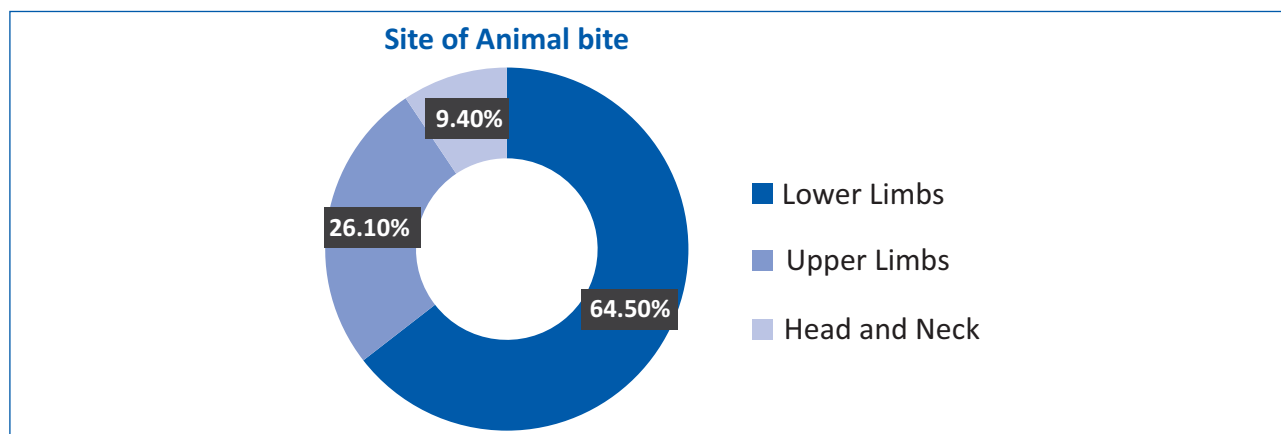
Out of the total animal bite cases, majority i.e. 236 (85.5%) were dog bites, 31(11.2%) were cat bites and remaining 5 (3.3%) were by rats.

Figure1: Distribution of cases according to the type of bite



Majority i.e. 178 (64.5%) of the bites were seen on lower limbs followed by 72 (26.10%) on upper limbs and the least i.e. 26 (9.4%) involved head and neck.

Figure 2: Distribution of patients according to site of animal bite



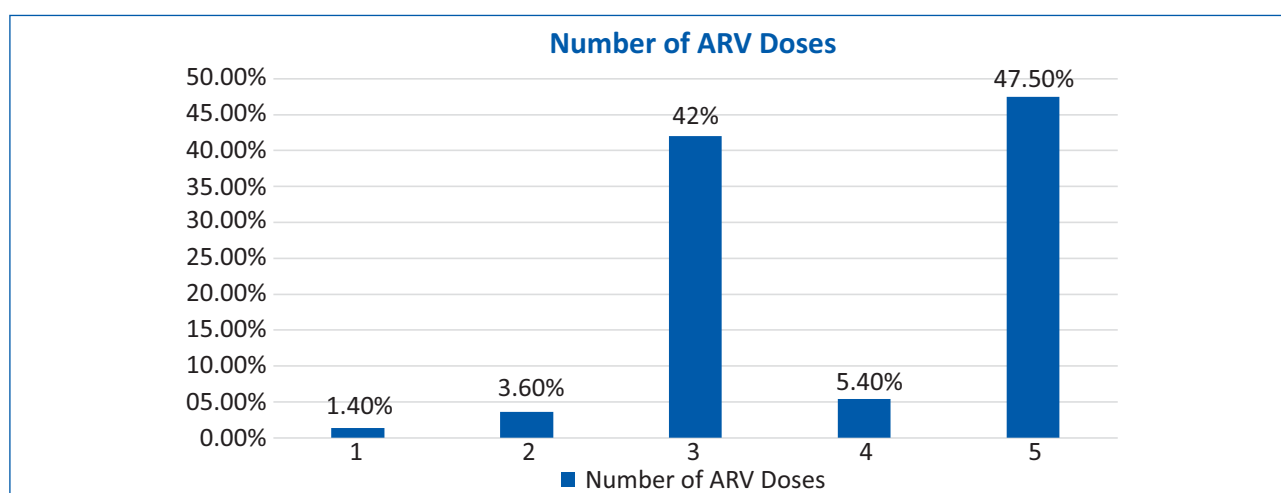
It was seen that out of the 276 animal bite cases, 10 (3.7%) belonged to category I according to the WHO guidelines, majority i.e. 164(59.3%) belonged to category II and 105 (37%) belonged to category III. Among all the age groups category II exposure was the most common, while among all the three categories of exposure were highest in the age group of 15-45 years.

Table 2: Age wise distribution of categories of animal bite for PEP

Age group	Category I	Category II	Category III	Total
0-5	1(0.4%)	13(4.7%)	9(3.3%)	23(8.4%)
6-14	0	30(10.9%)	15(5.4%)	45(16.3%)
15-45	6(2.2%)	84(30.4%)	61(22.1%)	151(54.7%)
46-60	3(1.1%)	22(7.9%)	7(2.5%)	32(11.5%)
>61	0	15(5.4%)	10(3.7%)	25(9.1%)
	10 (3.7%)	164 (59.3%)	105(37%)	276(100%)

It was noticed that only half i.e. 131 (47.50%) completed entire 5 dose IM Essen schedule of the vaccine.116 (42%) received only 3 doses, 15 (5.4%) received only 4 doses, 10 (3.60%) received only 2 doses and only 4 (1.4%) received only single dose of ARV.

Fig 3 Compliance among the patients to 5 Dose IM Essen vaccine schedule of ARV



None of the patients received ID regimens of ARV.

Discussion

In the present study majority of the study participants belonged to the age group of 15-45 years and majority were males which was similar to the study done by Bharadva N et al.⁷ Whereas in the study done by Dr Asma et al⁸ the highest number of bites were seen in the age group of less than 10 years.

Out of the 276 animal bite cases, majority (86%) were by dogs and over the lower limbs which was similar to the findings by Dr Asma et al.

In the present study in all the age groups exposure to category II was the highest whereas in a study done by Bharadva N et al⁷ category III exposure was highest.

It was noticed that only 131 (47.50%) completed entire 5 dose schedule of the vaccine. 116(42%) received only 3 doses while in a study done by Venkatesen K et al⁹ it was seen that 51.5% received more than 3 doses.

Conclusions

Dogs was the most common biting animal affecting mainly the age group of 15-45 years. Less than half of the patients complied with the entire 5 dose ARV Schedule. None of the patients were administered ID regimens.

Recommendations

Patient education regarding rabies & its prevention needs to be given. Importance of completing the 5 dose schedule needs to be emphasized among the patients. There is a need for implementation for policy on WHO approved ID regimens as per National Rabies Control Program.

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ORIGINAL ARTICLE

Monkey bite menace in a village in South Delhi

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Abstract

Background: Non-Human Primate (NHP) bites rank second to dog bites and first among travellers returning from endemic countries. Delhi has been facing monkey menace for a long period of time due to human-wildlife boundary disruption. The study was conducted to find the epidemiological profile of monkey bite victims and the circumstances of attack. **Methodology:** A mixed method study was conducted from April to October 2018 in two phases. First phase was a cross sectional study conducted on animal bite victims attending UPHC FatehpurBerli on a sample size of 315 selected by consecutive sampling technique. In the second phase transect walk in the village reporting highest proportion of monkey bites was conducted. Patients who received initial treatment / vaccine from different center were excluded from the study. No exit interview was taken. Explanations that interview was done after registration is included. Consecutive sampling technique was used. **Results:** 78(24.8%) of the animal bites reported were monkey bites. Of monkey bite victims 30(38.5%) were school going children (5-15 yrs). Majority of the bites 56(71.85%) were from Bhati-mines village. This village is in close proximity to Asola wildlife sanctuary area where monkeys caught in the urban localities were relocated. Overpopulation of monkeys with food scarcity in the sanctuary has resulted in migration of the monkeys to the village. This along with the poor housing standards has increased the risk of indoor unprovoked monkey bites among the village inhabitants.

Conclusion: Monkey bites have become a public health problem among residents of Bhati-mines. Immediate initiatives should be taken up to tackle the issue of prevention of monkey bites and its appropriate management.

Key words: monkey bites, rabies, non-human primates.

Introduction

Rabies, a vaccine preventable disease occurs in 150 countries, but remains a neglected tropical zoonotic disease (NTD) with 100% case fatality rate.^{1,2} India is endemic for Rabies, with 36% of the world's rabies deaths, of which 99% of human rabies transmission is through dog bites.^{1,3,4} Non Human Primate (NHP) bites rank second following dogs in most studies and first among travellers returning from Southeast Asia.⁵ Human rabies cases following monkey bites have been reported in local populations in India and Sri Lanka⁵, and in travellers returning from India to Australia and Germany.^{6,7} A total of 159 reports of rabies in NHPs have been retrieved from various sources in South America, Africa, and Asia.⁵ Rabies cases were reported in monkeys, langurs, and baboons in India.⁵ In South Delhi Municipal Corporation (SDMC) 766 cases of monkey bites / year were reported.⁸ Despite an increasing

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population of NHPs being reported as a menace in many urban areas in India and several studies from animal-bite clinics frequently documenting NHP bites, a very few reports of rabies in NHPs or human rabies following exposure to NHPs are published from India.⁹

Since animal bites are neither notifiable nor reported in the routine surveillance system, the data on animal bites in the country is scanty.¹⁰ A large number of monkey bite cases were reported to Primary health Center, Fatehpur Beri in South Delhi. Hence we decided to study their sociodemographic profile, trace high risk areas and understand the circumstances increasing the risk of monkey bites.

Material and Methods

A mixed method study was conducted in two phases from April to October 2018. The first phase was a cross sectional study conducted on animal bite victims attending Urban Primary Health Centre (UPHC), FatehpurBeri, a field practice area of Department of Community Medicine, Vardhman Mahavir Medical College and Safdarjung hospital.

In a pilot study of 50 animal bite patients coming to UPHC FatehpurBeri, 25% reported monkey bites. The sample size was calculated considering the $p = 25$; alpha error of 0.05 and relative error of 20%. Considering a non-response rate of 10%, final sample size was calculated to be 315. Consecutive sampling was used to select all the animal bite victims coming to UPHC, FatehpurBeri until the desired sample size was met. All new cases of animal bite victims visiting the center were included in the study. For children less than 12 years the adult accompanying them served as the informant. Patient who received initial treatment/ vaccine from different center were excluded from the study. A semi-structured, interviewer administered questionnaire which had variables including patient details (gender, age, education status), bite characters (site, time, place) and treatment details was used to collect data. The data were collected immediately after patient registration. Data was analysed to calculate proportions. We identified the village which had highest proportion of monkey bites. This village was considered for the second phase of the study.

In the second phase, a transect walk was conducted in the village during which observations and interviews were conducted. Observations of the area were made to identify the potential factors increasing the risk of monkey bite. During analysis these factors were tabulated under major headings. For informal interview with residents along the transect path respondents were chosen by purposive sampling. During these interviews we tried to understand the villagers' perceptions of the problem, reasons for the monkey bites and suggestions to prevent monkey bites. The responses are presented along with some verbatim quotes.

Ethical clearance was obtained from Institutional Ethics Committee of Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi. Written informed consent was obtained from participants of the study.

Results

Out of the 315 patients of animal bite included in the study, 78 (24.8%) patients were monkey bite victims. Among the monkey bite victims, 52 (67%) were females, 30(38.5%) were school going children (5-15 yrs) and 47 (60%) were aged less than 15 years. Among the 78 monkey-bite victims, 10(12.8%) had past history of monkey bites. Nearly half of the monkey bite cases belonged to lower middle socio-economic class.

Table 2 describes circumstances under which monkey bite occurred. Majority of the monkey bites 25(32.1%) occurred after 7 pm, indoors 59(75.6%) and were unprovoked bites 70(90%).

Table 3 describes the post-monkey bite management practices. A total of 57(73.1%) had received first aid after bite and 54(69.2%) washed with water; 44(56.4%) used soap with water, 2(2.6%) used water, soap and antibiotic and 3(3.8%) used only antiseptic over the wound. Among 54 who washed with water, 34 washed within 5 minutes of incident. 14 in 5-15 min, 2 washed in 15-30 min, and 4 washed after 30 min of injury. Out of 78, 5 (6.4%) applied other substances in injury site, 4 used chilli powder and 1 used mustard oil.

Figure 1 describes the geographic distribution of monkey bite victims. Majority of them i.e. 56 (72%) were from the village Bhati-mines. Transect walk was conducted in Bhati-mines, a village in South Delhi which was in close proximity to the Asola wildlife sanctuary area. The sanctuary area is demarcated with a boundary wall which was reported to be approximately 2 km from the observed study area. Table 4 summarizes the main findings of the transect walk.

Informal interviews were conducted at different points along the walk covering people of different age groups. The respondents reported that monkeys caused ‘a great deal of nuisance to everyday life’ and ‘it had steeply risen in the past 10 years resulting in about 10-12 monkey bite victims per week’.

The major reasons stated for monkey bites were ‘proximity of the village to the sanctuary area’, ‘monkeys being dropped just at the border of sanctuary area’, ‘poor maintenance of boundary wall’, ‘inadequate food for monkeys in the sanctuary area; and ‘poor housing standards of the localities’.

Suggestions to prevent monkey bites were that ‘boundary wall should be electrified at the top’ and that ‘more fruit plantations should be grown in sanctuary area’. Other suggestions for preventing monkey bites were- ‘improved housing to prevent monkey from entering homes’ and ‘children should not play with monkeys’. They also suggested that availability of vaccine in their locality would help them get prompt services.

Table1: Socio demographic profile of monkey bite victims

Socio – demographic profile		Frequency(%) n=78
Gender	Male	26(33.3)
	Female	52(66.7)
Age	<5 yrs	17(21.8)
	5 yrs - 15 yrs	30(38.5)
	16 yrs – 59 yrs	28(35.9)
	≥60 yrs	3(3.8)
Socio economic class*	Lower class (<Rs.938)	12 (15.4)
	Lower middle class (Rs.938-1875)	40(51.3)
	Middle class (Rs.1876-3126)	26(33.3)
	Upper middle class (Rs.3127-6253)	11(14.1)
	Upper class (≥Rs.6254)	1 (1.29)

*BG Prasad socio economic scale (areas covered under UPHC at FatehpurBerri are rural and urban)

Table 2: Circumstances under which monkey bite occurred

Bite characters			Frequency (%) n=78
Time	Dark	7pm – 6 am	25 (32.1)
		4pm-7pm	21 (26.9)
	Day time	6am-11.59am	17 (21.7)
		12pm-4pm	15 (19.2)
Place	Indoor	59 (75.6)	
	Outdoor	19 (24.4)	
Provocation	Provoked	7 (9)	
	Unprovoked	70 (89.7)	
	Not known	1 (1.3)	

Table 3: Post monkey bite management practices

Post bite Management		Frequency (%) n=78
Health care seeking behavior	≤1 day	64 (82.1)
	>1day	14(17.9)
First aid	Given	57(73.1)
	Not given	21(26.9)
Other substance use on the wound	Yes	5 (6.5)
	No	73 (93.5)

Fig 1: Geographic distribution of monkey bite victims reporting to Primary Health Centre, Fatehpur Beri

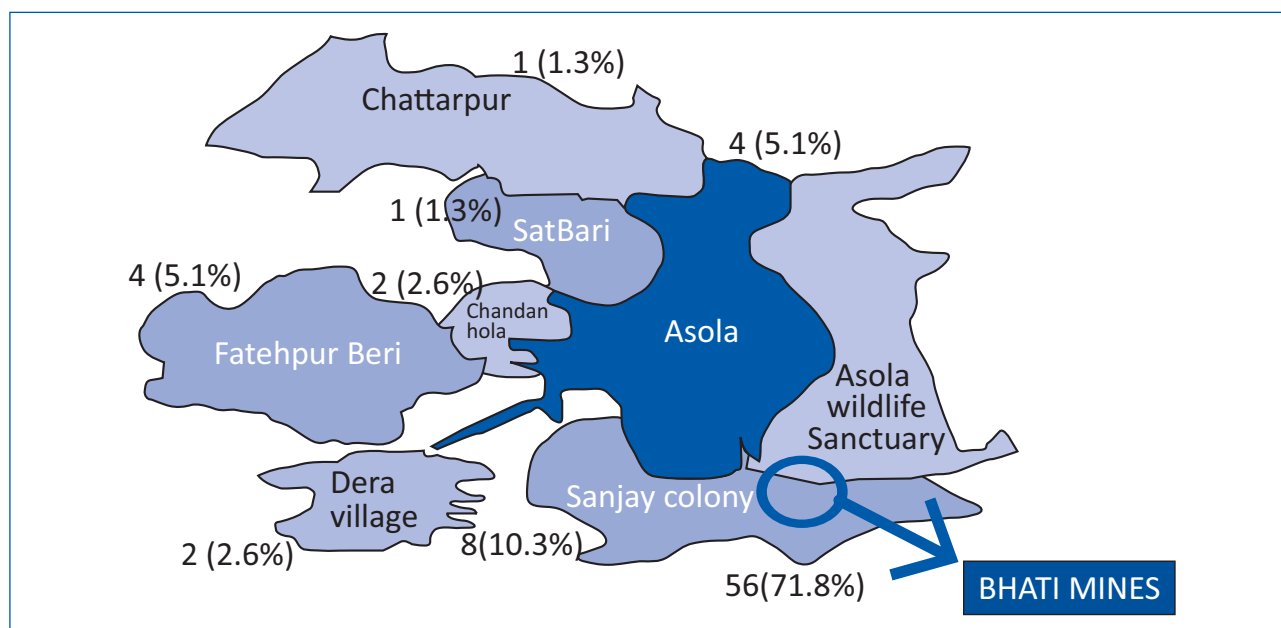


Table 4: Findings of factors affecting monkey bites identified during transect walk

	Entry	Residential area	School	Market Place
Type of construction	Kuccha roof	Kucha / pucca Roof	Pucca Roof	Kucha / pucca Roof
Plantation	Reserved plantation areas were dry without fruit trees and plantations	Not much of plantation seen	Trees were present	Not much of plantation seen
Roads	Roads present at entry	Roads/Muddy path	Roads	Roads/Muddy path
Animals	Dogs and Monkeys	Dogs, Monkeys, Cattle	Monkeys	Dogs, Monkeys

Discussion

In the first phase of our study it was found that 25% of animal bite cases reporting to UPHC Fatehpur Beri were monkey bite cases. According to WHO reports Monkey bites account for 2–21% of animal bite injuries and 2.2% as per a study conducted in India.^{1,10} Our study results showed that 72% of monkey bite victims were from Bhati-mines village, a part of Sanjay colony which is in close proximity to the Asola Sanctuary area. The issue of monkey

bites in Delhi has been discussed in the Parliament on several occasions.^{8,11} Private monkey catchers are deployed to trap these monkeys and relocate them to Asola Sanctuary.^{8,12} This sanctuary has now become overpopulated with more than 20,000 monkeys with inadequate food supplies. Articles of interview with sanctuary officers state that the monkeys are fed each day at five designated points in the sanctuary, a majority of the population has now become dependent on the food, but some monkeys may still stray out of the sanctuary. It is difficult to monitor each monkey unless a tracker is installed on each of them.¹³

Majority of the cases reporting monkey bites were females. Majority of the monkey bites took place indoors after 7 pm and were unprovoked. Our results of transect walk reveal that monkeys have migrated towards residential area in search of food and poor housing standards of the localities facilitated their entry into the house. Food scarcity for the monkeys could lead to unprovoked bites. More than half of the monkey bite cases were in the school going age group. During transect walk it was reported that children are frequently attacked in school premises.

Conclusion

Nearly one fourth of the animal bite cases reporting to the health centre were monkey bite victims and 72% of them were from Bhati mines village located near Asola Sanctuary. Majority reported first aid and had sought treatment within 24 hours of the bite. Yet in 18% cases there was a delay of more than 24 hours and 27% did not report first aid after monkey bite.

Recommendation

As short term approach we recommend that Information Education and Communication activities on local wound management and immunization for animal bites should be organized in these villages. We organized a health talk on preventive measures and post exposure management for monkey bites in Bhati-mines at the end of this study. Availability of anti-rabies immunization within the village area through its sub centre should be considered. As long term approach we recommend that the current strategy of capturing and relocating the monkeys needs to be revisited with a more scientific and robust approach. The sanctuary area must be made self-sustainable to feed monkeys. The illegal encroachment of sanctuary area should be controlled. Monkey bites has become an important public health problem among residents of Bhati-mines. Immediate initiatives should be taken up to tackle the issue of prevention of monkey bites and its appropriate management.

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ORIGINAL ARTICLE

Comparison of Immunochromatographic Test and Reverse Transcriptase Polymerase Chain Reaction for Detection of Rabies virus in Live as well as Post mortem animals

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Abstract

Rabies is an ancient global fatal disease of central nervous system (CNS) and most significant zoonotic and neglected viral disease that affects almost all kinds of mammals, including humans. The aim of the present study was to study the ante-mortem detection of rabies virus from saliva samples as well as post mortem detection of rabies virus from brain samples by Immunochromatographic test kit (ICT) and Reverse transcriptase polymerase chain reaction (RT-PCR) from different locations of Gujarat state. A total of 12 samples (6 brain samples and 6 saliva samples) were aseptically collected from rabies suspected live and dead animals (viz. dog, buffalo, cow and horse) for rabies virus detection. Results of this study revealed that all the six brain samples were found positive (100%) and three saliva samples out of six samples were found positive (50%) by both the tests, ICT and RT-PCR. Results obtained by ICT and RT-PCR for rabies diagnosis were almost similar implying that both the tests have yielded almost comparable results, and ICT can very well be adopted as a field level test for rabies diagnosis.

Key words: Rabies, Brain, Saliva, ICT, RT-PCR, Gujarat

Introduction

Rabies is historically one of the most significant zoonotic diseases, because of nearly 100% case fatality rate and ubiquitous global distribution (Blanton et al., 2008). Rabies is considered as a reemerging zoonosis in many parts of the world, particularly in countries of Asia, Africa and Latin America except Antarctica where the disease is enzootic despite the availability of proven prevention and control tools but more than 95% of human deaths occur in Asia and Africa (Sudarshan et al., 2007). Globally, Rabies is categorized as either urban (where dogs and cats are the major reservoir hosts), or sylvatic (major reservoirs are foxes, wolves, bats and other wildlife) rabies (WHO, 2013). It occurs mainly in the urban form in India, in which dogs play an important role as the reservoir and transmitter of the disease to humans and domestic animals (Sudarshan et al., 2007).

Rabies virus is the prototype member of the genus *Lyssavirus* of the family *Rhabdoviridae* under the order *Mononegavirales* (Wunner et al., 1995). It is a single stranded, negative-sense RNA virus, *Lyssavirus* (genotype 1)

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Some of the important aspect of this article is reused from the original thesis work of the Author

with a genome size of approximately 12 kb (Bourhy et al., 1993). Rabies viruses are bullet shaped measuring about 75 nm X 200 nm in size and can be roughly divided into a structural and a functional unit: the ribonucleocapsid core and the viral envelope (Badrane and Tordo, 2001; Rupprecht et al., 2002). Viral genome encodes total five structural genes which are separated by four non-coding intergenic sequences from 3' terminus to 5' terminus in the order of N-P-M-G-L, which encode respectively the nucleoprotein (N), phosphoprotein (P), matrix protein (M), glycoprotein (G) and large subunit of transcriptase (L) (Wunner et al., 1998).

Conventionally, Rabies diagnosis generally revolves around direct visualization by electron microscopy, direct or indirect FAT (OIE recommended confirmatory test), virus cultivation in cell lines, mouse inoculation test (MIT), immunohistochemistry, enzyme immunoassay but these tests are only feasible after the death. Molecular technique such as the RT-PCR has been applied by various researchers to improve the sensitivity and specificity of ante- as well as post-mortem diagnosis of rabies (Kamolvarin et al., 1993). Recently, Researchers have developed a novel diagnostic test for rabies virus using immunochromatographic techniques which can achieve rapid and sensitive detection for rabies virus using MAb which recognize the N protein of rabies virus. In this study we have shown the uniqueness of rapid diagnostic test kit and evaluated its efficacy by comparing it with RT-PCR. The rapid diagnosis test is simple, time- and cost-saving. It can be used anywhere in the world and needs no special reagents or equipment (Nishizono et al., 2008).

Research endeavour on rabies in India has been very less in spite of the fact that India accounts for the maximum human incidences and death thereby reflecting the significance of animal rabies. The present study was aimed for the ante-mortem detection of rabies virus from saliva samples as well as post mortem detection of rabies virus of suspected rabies cases from brain samples by Immunochromatographic test kit (ICT) and RT-PCR from the samples collected from different locations of Gujarat state, India.

Materials and Methods

Collection of Samples

Brain samples (n=6) were collected aseptically from rabies suspected animals during post mortem examination at the Department of Veterinary Pathology, College of Veterinary Science & Animal Husbandry, AAU, Anand and were also received from field through various organizations (Figure1).

Saliva samples (n=6) were collected from live animals which were suspected for rabies at the Teaching Veterinary Clinical Complex (TVCC), College of Veterinary Science and Animal Husbandry, A.A.U., Anand (Figure 2). The details of samples are given in table 1. Brain homogenate (10%) was prepared in sterile phosphate buffer saline. Saliva suspension was prepared by dipping saliva swabs collected from live suspected animals in 4 ml of phosphate buffer saline. Brain homogenates and saliva suspensions were stored at -40° C in deep freeze for further use.

Immunochromatographic Test

Immunochromatographic test (ICT) was used for the qualitative detection of rabies virus antigen from saliva and brain homogenates. The ICT was performed using Anigen Rapid Rabies Ag Test Kit (BioNote Inc., Korea). If enough Rabies virus antigen is present in a sample, a purple test line will be visible in the result window. To carry out the test, swab was dipped in prepared brain homogenate or saliva suspension and then inserted into the specimen tube containing 1 ml of assay diluent. Four drops of the sample were added into the sample hole using the disposable dropper provided in the kit. Result of the test was interpreted within 10 minutes.

RNA extraction and RT-PCR

The RNA was extracted from brain homogenates and saliva suspensions using QIAamp Viral RNA mini kit, 50 reactions (Catlog No. 52904, QIAGEN, Valencia, CA) as per the manufacturer's instructions. RT-PCR was performed

using Qiagen one-step RT-PCR Kit (Qiagen, Germany, cat no. 210210). The primer set used for one step RT-PCR was JW12(F) ATGTAACACCTCTACAATG and JW6(R) CAATTAGCACACATTTTGTG targeting 605bp size amplicon of the nucleoprotein gene of rabies virus (Arvindhababu et al., 2014). RT-PCR was carried out in a final reaction volume of 25 µl using 200 µl capacity thin walled PCR tubes comprising of 5 µl Qiagen one-step RT-PCR Buffer (5×), 1 µl of dNTP mix (10mMol), 1.5 µl of each primer (10 pmole), 1 µl of Qiagen one-step RT-PCR enzyme mix, 5 µl of RNA template (30ng/ul) and 10 µl of RNase free water. The RT-PCR reactions were performed in thermocycler (Biorad, USA) with following cycles; reverse transcription 50°C for 30 min, initial denaturation of 95°C for 15 min followed by 35 cycles of denaturation, annealing and extension at 94°C for 30s, 50°C for 30s and 72°C for 60s, respectively, and the final extension was carried out at 72°C for 10 min.

Electrophoresis

RT-PCR amplified product was confirmed by Electrophoresis. To confirm PCR amplification, 5 µl product from each PCR tube was mixed with 1 µl of 6X gel loading buffer and placed in the well and electrophoresed along with 100bp DNA molecular weight marker (GeneRuler, MBI Fermentas) on 2% agarose gel containing ethidium bromide at the rate of 1 µl / 20 ml gel, at constant 100 V for 45 min in 0.5X TBE buffer. The amplified product was visualized as a single compact band of expected size under UV light and documented by gel documentation system (SynGene, Gene Genius Bio Imaging System).

Results

Immunochromatographic test

All the brain samples were found positive (100%) by Immunochromatographic test by showing two purple lines, one in control and second in test. In saliva samples, three saliva samples out of six samples were found positive (50%) by Immunochromatographic test. The three negative saliva samples showed only one line in control on Immunochromatographic test kit (Table 1, Figure 3).

RT-PCR

In RT-PCR, all the six brain samples were positive (100%) whereas out of six saliva samples, three samples were found positive (50%) by amplifying the expected 605bp size amplicon on gel documentation system. Negative samples had not showed any band (Table 1, Figure 4).

Discussion

In present study, Immunochromatographic test revealed 100% positivity in case of brain samples and 50% positivity in case of saliva samples. Reta et al. (2013) found 82 positive samples out of 115 brain samples from rabid animals by immunochromatographic test, while 85 samples were found positive by d-FAT. Servat et al. (2011) revealed 100% positivity of rabies from brain material of European mammals. Markotter et al. (2009) detected 100% positivity of African lyssaviruses from brain materials. Nishizono et al. (2008) also found 95.5% positivity using brain samples from rabid dogs. Kang et al. (2007) with total 110 samples including saliva and brains and found 52 positive samples by immunochromatographic test, while 57 samples were found positive with more sensitive and specific techniques such as d-FAT and RT-PCR. Studies on usefulness of immunochromatographic test have also been carried out by Kasempimolporn et al. (2011), Ahmed et al. (2012) and Savaliya et al. (2015).

All the six brain samples and three saliva samples were found positive by RT-PCR. Similar study was performed by Arvindhababu et al. (2014), which resulted in detection of N gene of rabies virus in 43 out of 53 brain samples with a specific 605bp band size using the same primers as used in present study. McElhinney et al. (2014) detected rabies viral RNA from decomposed samples by RT-PCR on days 70, 48 and 48 at 4°C, 25°C and 35°C, respectively and suggested that when decomposed samples are likely to be submitted, RT-PCR can be used to accompany

OIE-prescribed rabies diagnostic tests. Sharma et al. (2014b) found 20 positive samples by RT-PCR from 34 skin biopsies samples of clinically suspected animals (11 buffaloes, 8 cows, 13 dogs, 1 cat and 1 horse). Similarly, Bansal et al. (2012) detected nine positive samples out of 20 skin biopsy samples by conventional RT-PCR. Number of other workers viz. Heaton et al. (1999), Ito et al. (2001), Dantas Junior et al. (2004), Biswal et al. (2007), Nishizono et al. (2008), Arvindhababu et al. (2012), Dandale et al. (2013) have also endorsed the usefulness of RT-PCR for rabies diagnosis. On comparison of both these tests, it is revealed that results obtained by ICT and RT-PCR for rabies diagnosis were almost similar. This implies that both the tests have yielded almost comparable results. ICT gives rapid results compared to RT-PCR hence ICT can very well be adopted as a field level test due to its rapid diagnosis, its easy procedure and less demanding in terms of facilities required.

Conclusions

The present study revealed that the Immunochromatographic test and RT-PCR yielded comparable results for detection of rabies virus from brain and saliva samples with an additional advantage of using them in live animals. Immunochromatographic test can very well be adopted as field level test for prompt diagnosis of rabies. It implies that modern tools like RT-PCR can be useful in detecting rabies virus in a sensitive way and has more relevance with regard to confirmatory diagnosis in live animals using saliva samples.

Table 1: Details of samples and results obtained by Immunochromatographic test and RT-PCR

Sr. No.	Animal	Type of sample	Location	Immunochromato-graphic test	RT-PCR
1	Buffalo	Brain	Mehsana	+	+
2	Buffalo	Brain	Mehsana	+	+
3	Buffalo	Brain	Mehsana	+	+
4	Buffalo	Brain	Mehsana	+	+
5	Cow	Brain	Surat	+	+
6	Buffalo	Brain	Rajkot	+	+
7	Dog	Saliva	Ambali	+	+
8	Dog	Saliva	Anand	+	+
9	Buffalo calf	Saliva	Anand	-	-
10	Dog	Saliva	Ode,Anand	+	+
11	Dog	Saliva	Borsad,Anand	-	-
12	Horse	Saliva	Tarapur,Anand	-	-

Figure 1: Collection of brain sample from rabies suspected dog during post mortem



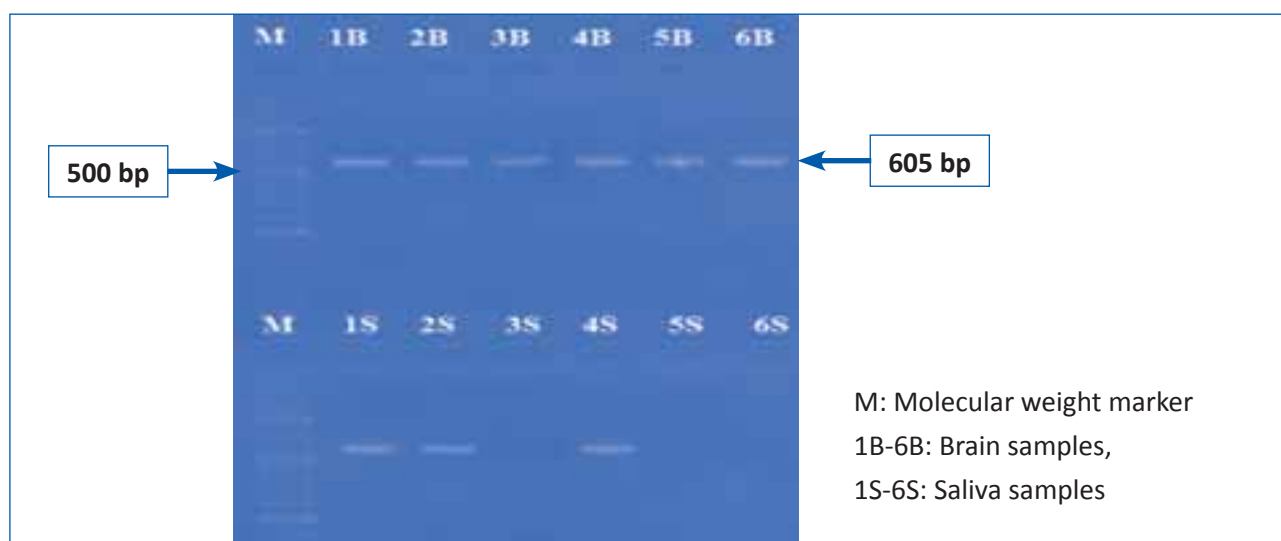
Figure 2: Collection of saliva sample from rabies suspected dog



Figure 3: Immunochromatographic test for rabies diagnosis



Figure 4: RT-PCR results using brain and saliva samples for rabies diagnosis



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ORIGINAL ARTICLE

Clinical Profile and Factors associated with Hydrophobia Cases admitted in Isolation ward at Tertiary Care Hospital, Ajmer

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Abstract

Introduction: Rabies is a highly fatal and completely preventable viral disease of the central nervous system occurring in more than 150 countries. It is primarily a zoonotic disease transmitted by bites and licks of rabid animals. Although a number of wild animals serve as natural reservoir, rabies in dog is the main source of infection in most cases of developing rabies.¹ Global elimination of the disease is feasible through mass vaccinations of dogs, which transmit most rabies cases to humans. Though 100% fatal, rabies can be easily prevented by proper post exposure - thorough washing of wound by soap and water, local administration of anti-rabies immunoglobulin and active immunisation by anti-rabies vaccine (ARV).⁷ Misconception, cost, non-availability contributes for poor management of animal bites cases. With this background the present study is carried out with an objective to know the profile of hydrophobia cases attending Tertiary care Hospital, Ajmer. **Method and Materials:** The study period for collecting data from January 2016 to October 2018. The data included personal information, site of bite, category of the wound, biting animal and post exposure prophylaxis status. **Observation and Result:** The observation was done on socio-demographic profile, site of bite, grade of bite, types of animal bites, post-exposure prophylaxis, clinical presentation of hydrophobia, time interval between bite and death of study subjects and results were recorded year wise. **Discussion:** There is a contrast between authors that majority of human rabies cases were either males or children. The lower leg represented the commonest bite location. Highest incidence of bites were in Grade III category and was most commonly observed in children (<15 yrs). Most patients did not receive proper rabies vaccination post exposure. **Conclusion and Recommendation:** Majority of the cases had not received any PEP either due to ignorance or due to lack of access. Increasing awareness in the community regarding animal bites and adequate management with PEP can prevent rabies as per following National and WHO approved guidelines.

INTRODUCTION:

Rabies is a highly fatal and completely preventable viral disease of the central nervous system occurring in more than 150 countries and territories. It is primarily a zoonotic disease transmitted by bites and licks of rabid animals.

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Although a number of wild animals serve as natural reservoir, rabies in dog is the source of infection in around 99% of the cases of human rabies.¹ Rabies in man is called hydrophobia. The disease begins with prodromal symptoms such as headache, malaise, sore throat and slight fever lasting for 3-4 days. About 80% of patients complain of pain or tingling at the site of the bite.¹ Hydrophobia can be defined as a morbid dread of water, extreme fearfulness of swallowing liquids that is symptomatic of rabies and results from painful spasms of the throat.² Rabies victims at first feel a general malaise and restlessness, then grow increasingly agitated with painful spasms of the throat. Soon they cannot drink, which is why rabies has been called “hydrophobia.”² This disease is present on all continents, except Antarctica, with over 95% of human deaths occurring in the Asia and Africa regions.³ Global elimination of the disease is feasible through mass vaccinations of dogs, which transmit 95% of rabies cases to humans. Despite this, an estimated 59,000 people die from rabies across the world each year, with around 90% of these deaths occurring among children living in rural areas in Africa and Asia. In India alone, estimates range between 18,000 to 20,000 human deaths from rabies each year. Many of these victims are children, often dying outside of medical facilities – meaning their deaths go unrecorded.⁴ The reason behind such a large number of rabies death are generally lack of awareness of preventive measures, insufficient dog vaccination, uninterrupted growth of canine population, lack of knowledge about importance of wound management, poor knowledge on post- exposure prophylaxis and also non-compliance to the vaccination schedule.^{5,6} Though 100% fatal, rabies, following bite of suspected rabid animal can be easily prevented by proper post exposure treatment which includes three things - thorough washing of wound by soap and water, local administration of anti-rabies immunoglobulin and active immunisation by anti-rabies vaccine (ARV).⁷ The factors like ignorance, myths and misconception, cost, non-availability contributes for poor management of animal bites cases despite the clear history of animal bite and availability of PEP, with this background the present study is carried out with an objective to know the profile of hydrophobia cases attending Tertiary care Hospital, Ajmer.

METHOD AND MATERIAL:

The present hospital based descriptive study was conducted at Isolation ward of Jawaharlal Nehru Medical College, Ajmer. A total of 42 hydrophobia cases were reported at the ward from Jan 2016 to Oct 2018 for palliative treatment. Information regarding socio-demographic variables was recorded. Information of 2018 was gathered from patients’ attendants, case papers and wound assessment after obtaining informed consent from them. Previous data (2016, 2017) was obtained from hospital records. The collected data included personal information, site of bite, category of the wound (Wound Category as per National Guidelines), biting animal and Post exposure prophylaxis status. The data was analyzed using descriptive statistics.

OBSERVATION:

Table-1: Socio- demographic profile of study subjects

Variable	Rural							
	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
< 15	04	40	06	42.85	04	44.44	14	42.42
15-29	02	20	01	7.14	01	11.11	04	12.12
30-44	01	10	01	7.14	00	00	02	6.06
45-59	01	10	02	14.28	01	11.11	04	12.12
>60	02	20	04	28.58	03	33.33	09	27.27
TOTAL	10	100	14	100	09	100	33	100

Variable	Urban							
	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
< 15	02	66.67	03	75	01	50	06	66.67
15-29	00	00	01	25	01	50	02	22.22
30-44	00	00	00	00	00	00	00	00
45-59	00	00	00	00	00	00	00	00
>60	01	33.33	00	00	00	00	01	11.11
TOTAL	03	100	04	100	02	100	09	100

Variable	Rural							
	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
Male	08	80	11	78.57	08	88.89	27	81.82
Female	02	20	03	21.43	01	11.11	06	18.18
TOTAL	10	100	14	100	09	100	33	100

Variable	Urban							
	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
Male	02	66.67	03	75	02	100	07	77.78
Female	01	33.33	01	25	00	00	02	22.22
TOTAL	03	100	04	100	02	100	09	100

Table - 2: Site of bite of study subjects

SITE OF BITE	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
Head and Neck	03	23.07	05	27.77	01	9.09	09	21.42
Upper Extremity	04	30.76	04	22.22	2	18.18	10	23.81
Lower Extremity	06	46.15	09	50	08	72.72	23	54.76
Total	13	100	18	100	11	100	42	100

Table- 3: Grade of bite of study subjects

GRADE OF BITE	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
II	01	7.69	02	11.11	01	9.09	04	9.52
III	12	92.30	16	88.89	10	90.91	38	90.48
Total	13	100	18	100	11	100	42	100

Table- 4: Types of animal bites of study subjects

BITING ANIMAL	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
Street Dog	10	76.92	16	88.88	10	90.90	36	85.71
Cat	02	15.38	01	5.55	01	9.09	04	9.52
Monkey & other wild animals	01	7.69	01	5.55	0	00	02	4.76
Total	13	100	18	100	11	100	42	100

Table- 5: Post- exposure prophylaxis taken by study subjects

POST EXPOSURE PROPHYLAXIS	YEAR 2016		YEAR 2017		YEAR 2018		TOTAL	
	N	%	N	%	N	%	N	%
No Treatment	04	30.77	05	27.78	02	18.18	11	26.19
Partially Vaccinated	06	46.16	09	50	05	45.45	20	47.62
Anti Rabies Serum & Partial Vaccination	03	23.07	04	22.22	04	36.36	11	26.19
Total	13	100	18	100	11	100	42	100

Table-6: Clinical presentation of hydrophobia in study subjects

Symptoms	Number	Percent
Fever	33	78.57
Irritation & Pain at Site of Bite	4	9.52
Hydrophobia	39	92.85
Photophobia	3	7.14
Aerophobia	23	54.76
Noise phobia	3	7.14
Paresthesia	2	4.76
Altered sensorium	11	26.19
Abnormal behaviour	13	30.95
Neck rigidity	1	2.83
Rigidity in limbs	1	2.83
Body ache	2	4.76
Breathlessness	5	11.90
Vomiting	4	9.52
Salivation	5	11.90
Dysphagia	6	14.28

Table-7: Time interval between bite and death of study subjects

TIME INTERVAL	NUMBER	PERCENTAGE
Less than 1 month	15	35.71
1 – 3 months	22	52.38
3 – 6 months	05	11.90

Table-1 shows that out of total no. of cases (42) which were observed in a span of 3 years i.e. 2016, 2017 & 2018, maximum of the cases were the residents of rural area (33/42, 78.57%) and the rest (09/42, 21.43%) of urban area. Highest no. of cases were observed in the age group <15 years that is 4(40%), 6(42.85%) & 4(44.44%) in the years 2016, 2017 & 2018 respectively. Similar trend was seen in the cases from urban area as well which was 02(66.67%), 03(75%) and 01(50%) in the years 2016, 2017 & 2018 resp. Maximum no. of the cases were males (27/33, 81.82%) from rural area as well as from urban area 7/9 (77.78%). Females were 6/33 (18.18%) from rural area & 2/9 (22.22%) belonged to urban area.

Table-2 shows that lower extremity was the most common site exposed to animal bite 54.76% followed by upper extremity (23.81%) and Head & Neck region i.e. 21.42%. No single case was observed in the trunk & back region.

Table-3 shows that out of 42 animal bite cases, 38 (90.48%) were grade III bites and only 4 (9.52%) case had grade II bite.

The main animal responsible for bites were Street dogs (85.71%) followed by cats (9.52%), Monkey and other wild animals (4.76%) as observed in **Table-4**.

In this study it was observed that only 31 patients (73.81%) had taken the first dose and the remaining 11 (26.19%) had not taken the first dose itself. Only 11 (26.19%) among those who had taken their first doses had taken ARS (Anti Rabies Serum) but were partially vaccinated. Not a single case had taken the full vaccination as observed in **Table-5**.

Fever was the most frequent prodromal symptom (33, 78.57%). Signs of Autonomic Nervous System dysfunction included Hydrophobia (92.85%) & Hyper-salivation (11.9%) were observed. Altered sensorium (26.19%) & abnormal behaviour (30.95%) were also seen, which are the signs of CNS involvement.

Table-7 shows that in maximum number of cases, (52.38%) the time interval between bite and death was 1-3 months. In 15 (35.71%) cases the time interval was < 1 month. Attendants of 37 (88.09%) cases took their patient back at home against the medical advice when they came to know about the prognosis of the disease. Only 05 (11.90%) patients stayed back at hospital till they died.

In-depth interview revealed 8/11 (72.72%) cases took their bite casually and thought bites of cats and dogs to be inconsequential. 7/11 (63.63%) cases were unaware of free of cost availability of PEP in Government Hospitals. Non availability of anti-rabies serum (RIG) in rural areas was a barrier for 72.7% of the cases. The attendants of the cases were unaware of doses, site of infection, benefits of immediate wound washing, necessity of local antiserum administration.

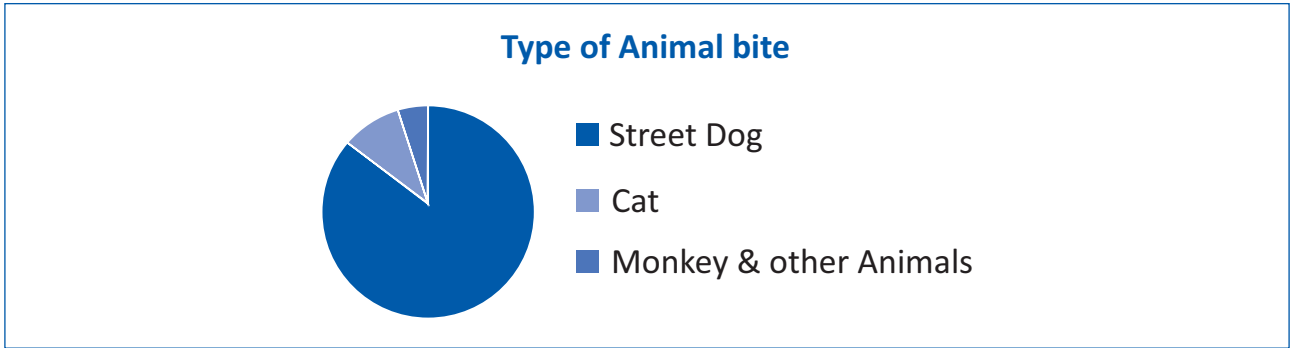


Chart - Types of Animal Bites

DISCUSSION:

Majority of the human rabies cases were males. This is similar to observations made in other studies.^{8,9,10} Children aged less than or equal to 15 years constituted 32.5% which is maximum of the cases, that is similar to the observations made by Satapathy DM et al⁹ which had observed that majority of the rabies victims were children in contrast with some of the authors in previous studies at different places in India.^{9,10} The present study revealed that the majority of the cases were from rural areas. Similar observations were made in studies conducted at Lucknow⁹ and Amritsar.¹⁰ In this study, the lower leg represented the commonest bite location. This is probably because of the fact that children and adults might use a leg to tease or abuse animals, separate fighting dogs or defend against dog attacks, resulting in more bites on the extremities. Significantly highest incidence of bites were in Grade III category and it was most commonly observed in children (<15 yrs). Again, the possible reason could be that these children show an explorative and playful behaviour with animals, but are unwary about bite risk and cannot defend themselves when attacked, resulting in more severe injury.¹¹ Animal bites (mainly dog bites) are a

common occurrence in many developing countries across the globe. In the present study majority of cases 85.71% presented with history of dog bite. Behera TR et al¹² in their study in Berhampur, Orissa reported that among animal bite cases attending Anti Rabies Clinic, 84.5% were victims of Dog bite. Renu Bedi¹³ et al also reported 90.7% of animal bites were due to dogs. Manish Kumar et al Lucknow¹⁴, also reported that 94.5% of animal bites were due to dogs. The present study illustrates that most patients 80% did not receive proper rabies vaccination post exposure out of these 42.5% were partially vaccinated and 37.5% who did not receive any vaccination at all, while Manish Kumar¹⁴ reported 85% of cases who did not receive proper rabies vaccination and Chhabil Kumar et al¹⁵ illustrated that most patients (76.7%) did not receive proper rabies vaccination or passive immunization post exposure. In the present study hydrophobia was observed in 92.85% of cases same as the observations made by Chhabil Kumar et al¹⁵ where 81.3% of cases showed this symptom. The most frequent prodromal symptom reported in current study was fever (78.57%), altered sensorium (26.19%) & abnormal behaviour (30.95%) similar to the study done by Chhabil Kumar et al¹⁵.

CONCLUSION AND RECOMMENDATION

From the present study it is evident that the suspected human rabies cases admitted had not received complete schedule of post exposure prophylaxis. The high mortality in India due to rabies is attributed to lack of awareness of PEP for animal bites and also lack of access to vaccine and immunoglobulin. Our study also shows that majority of the cases had not received any PEP, either due to ignorance or due to lack of access can only be speculated. Therefore, we can conclude that lack of awareness, ignorance, myths, misconceptions, cost, non-availability and poor management leads to the development of Hydrophobia after animal bite. Increasing awareness in the community regarding animal bites and adequate management with post exposure prophylaxis can prevent Rabies.

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ORIGINAL ARTICLE

Community Belief, Myths and Perceptions about Animal Bite Cases in an Urban area of Berhampur: A Qualitative Study

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Abstract

Introduction: Rabies is an enzootic and epizootic disease worldwide. 99% of all human deaths due to rabies are occurring in the developing countries. Rabies is highly fatal disease yet preventable. **Objective:** To find out the common beliefs, myths and perception about animal bites in an urban community in Berhampur, Odisha. **Materials & Methods:** This was a qualitative study done in Gandhinagar, an urban area in the town of Berhampur, Odisha using Free-listing. After obtaining consent, the data was collected until the point of saturation by door to door survey and analyzed using Anthropac version 4.983. **Results:** The mean age of the participants was 46.67 ± 3.59 years. Majority of the people believed that Dog was the most common cause for Rabies (SS score = 0.879). A very few people believed wound toileting with water and soap was necessary (SS Score = 0.077). **Conclusion:** The general idea about the first aid was low but majority of the respondents believed that treatment in hospital was necessary. **Recommendations:** The awareness about First Aid and PEP of Rabies can be increased by educating the community by various IEC methods. Control of stray dog population by ABC program through the municipality must be taken up at a larger scale.

Keywords: Rabies, Qualitative, Myths, Misconceptions, Freelisting

Introduction

Rabies is an enzootic and epizootic disease worldwide. 99% of all human deaths due to rabies are occurring in the developing countries.¹ India is known for its diverse social and cultural backgrounds. Between the States and between the districts itself the people's belief and practices vary. Even now, a wide range of myths and misconceptions related to diseases/ illnesses are prevalent and people have great faith in rudimentary folk medicine of unproven efficacy.² In India it is estimated that the number of death due to rabies may be 10 times more than those reported.¹ Myth refers to widely held but false belief or idea with reference to particular illness/ diseases. In India, various cultural practices are followed after exposure to a dogbite, for example, application of soil, chili paste, oil etc.³ Rabies is one of the neglected tropical diseases which is highly fatal yet preventable. Effective treatment soon after

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exposure to rabies can prevent the onset of symptoms and death.⁴ Due to various misconceptions, myths and lack of knowledge regarding proper first aid and post exposure prophylaxis; majority of the people are unable to escape the wrath of this dreadful disease.

Free listing has been a standard approach used in anthropology to define the elements of a domain (such as “Animals causing Rabies”) and the extent to which group members share those definitions⁵; however, this approach has not been used widely in public health. In free listing, participants generate a list of terms, chosen from the universe of all words, to describe their perceptions or definitions of a domain⁶. Saliency was derived using a saliency index (Smith’s S) defined as:

$S = ((L - R_j + 1)/L)/N$, where L is the length of each list, R_j is the rank of item J in the list, and N is the number of lists in the sample⁷. Saliency characterizes terms that are prototypes for the particular domain of interest accounting for both the frequency and order of the words.

With this background the study was done with the objective to find out the common beliefs, myths and perception about animal bites in an urban community in Berhampur, Odisha.

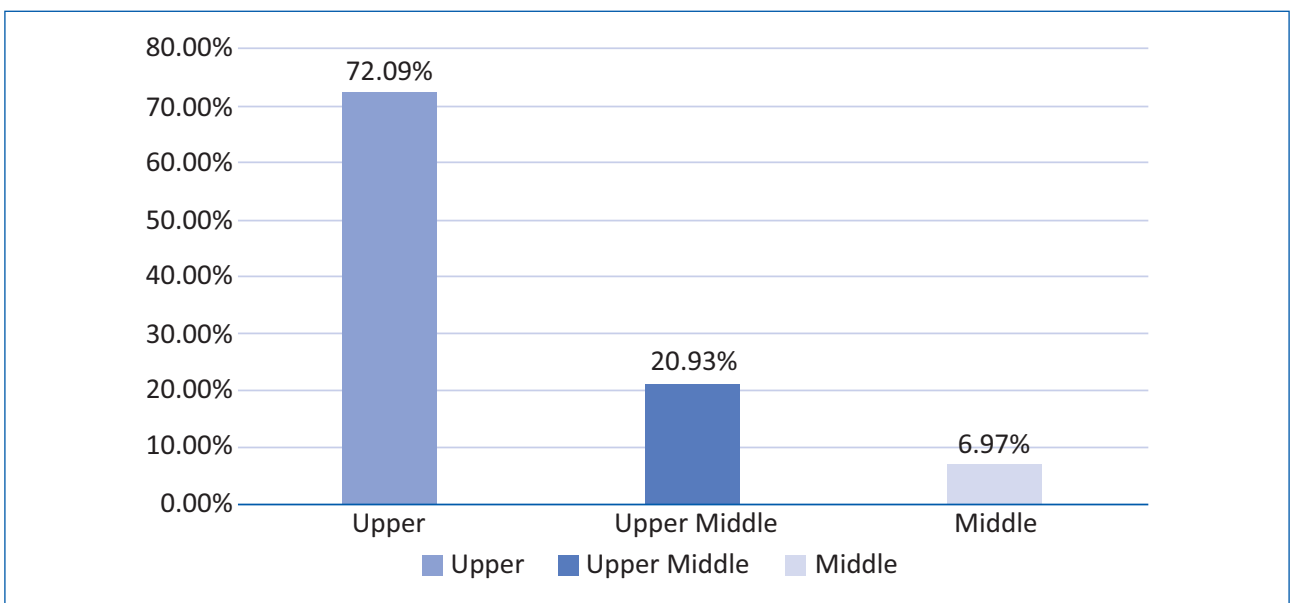
Materials and Methods

This was a qualitative study done in the month of May 2017 among the residents of Gandhinagar, an urban area in the town of Berhampur of Southern Odisha. IEC approval was sought and out of 40 wards in Berhampur, Gandhinagar was selected purposively for the study. Door to door survey was carried out and one individual per house were selected conveniently for the purpose of data collection after obtaining their consent. The data was collected using the self-administered questionnaire that contained both closed and open-ended questions. The questionnaire also incorporated a Free listing tool that consisted of two domains namely- 1) Animals causing rabies 2) First aid and treatment. Data was collected till the point of data saturation. The quantitative data was expressed in frequencies. The qualitative data was analyzed using Anthropic version 4.983 and Smith’s salient Score was calculated.

Results

A total of 86 participants took part in the study that consisted of 54 males (62.79%) and 32 females (37.20%). The mean age of the participants was 46.67 ± 3.59 years.

Figure1. Socio Economic Status (Modified BG Prasad’s scale, 2016



None of the participants belonged to lower middle or lower class. Majority (72.09%) belonged to the upper class followed by Upper middle (20.93%) and Middle class (6.97%).

Majority of the respondents believed that some infection is caused when an animal bites. A few people knew about the term “Rabies”.

Table 1: Free Listing results for the domain: “Animals causing Rabies”

Sl No.	Item	Frequency	Resp Percentage	Avg Rank	Smith’s Salient Score
1	DOG	83	97	1.482	0.879
2	MONKEY	65	76	2.475	0.705
3	CAT	58	67	2.910	0.610
4	WOLF	48	56	7.917	0.098
5	DONKEY	47	55	7.064	0.151
6	FOX	46	53	5.652	0.243
7	JACKAL	44	51	4.341	0.305
8	PIG	43	50	5.674	0.220
9	BEAR	39	45	6.385	0.177
10	OX	9	10	4.222	0.059
11	COW	7	8	7.429	0.019
12	RAT	3	3	6.000	0.013
13	LION	3	3	4.667	0.020
14	BOAR	3	3	4.333	0.020
15	PARROT	2	2	9.000	0.004
16	BAT	1	1	4.000	0.005
17	RABBIT	1	1	2.000	0.010
18	SNAKE	1	1	12.000	0.002
19	HORSE	1	1	5.000	0.005
20	DEER	1	1	5.000	0.002

Maximum people believed Dog bite is the most common cause for rabies. Smith’s salient score for dog was 0.879. This was followed by Monkey (Smith’s salient score = 0.705) and Cat (Smith’s salient score = 0.610).

There were a number of myths still persistent in the community out of which majority of the respondents believed that the person who is bit by the dog must not go out in the rains. Many people believed that they must not eat sour things if any animal bit them and also that when small children are bitten by dog, they must be taken to the traditional healer for “jhaadaphoonka” which will help in removal of the evil eye.

Table 2: Free listing results for the domain “First Aid and treatment”

SI No.	Item	Frequency	Resp Percentage	Avg Rank	Smith's Salient Score
1	HOSPITAL	57	69	2.561	0.402
2	TT	29	35	2.552	0.204
3	DETTOL & TT	22	27	1.227	0.247
4	NEEM	20	24	2.300	0.165
5	DETTOL	15	18	2.533	0.127
6	TURMERIC	13	16	2.385	0.099
7	BITTERGOURD	11	13	3.091	0.067
8	SAVLON	9	11	2.111	0.080
9	SOAP & WATER	8	10	2.000	0.077
10	DRESSING	8	10	2.625	0.053
11	OINTMENT	7	8	1.714	0.062
12	SPIRIT	6	7	2.333	0.054
13	BANDAGE	6	7	2.333	0.051
14	CLOTH TIE	6	7	2.167	0.046
15	TRADITIONAL HEALER	5	6	3.000	0.033
16	ARAKHA LEAVES	4	4	2.000	0.028
17	WATER	4	4	1.000	0.036
18	ANTIBIOTIC	2	2	3.500	0.010
19	NAILPOLISH	2	2	2.000	0.016
20	LIME	2	2	2.500	0.015

Most of the people believed that some treatment in the hospital is necessary (Smith's salient score = 0.402). The Smith's salient score for first aid with Dettol and TT was 0.247. Very few people listed soap and water for first aid (Smith's Salient Score = 0.077).

Discussion

Bite by a rabid dog will lead to rabies, which is a fatal disease without any cure. Rabies is one of the most important zoonotic diseases in India and one of the oldest recognized diseases which affect humans⁸. Various cultural practices are followed after dog bite and different myths are associated with the disease, which can influence the post exposure treatment seeking behavior of the victims⁹.

In this study a total of 54 males and 32 females took part. The mean age of the participants was 46.67 ± 3.59 years. This was similar to the study conducted by Jakasania AH et al³. Maximum people in this study believed that rabies is caused by Dog bite which was similar to the findings in the study conducted by Varsharani et al⁸, Ghosh S et al¹⁰ and Sekhon A S et al¹¹. People also listed parrot (SS score = 0.004) and snake (SS score = 0.002) as a cause of rabies that clearly indicates towards the knowledge gap about rabies in the community.

In this study, a vast majority of the people believed that people must not eat sour things and should not go out in rains. They also believed that small children needed to be taken to the traditional healer in case of animal bites. People also believed that neem, bittergourd and arakha leaves are to be applied on the wound for dressing. This was similar to the findings of the study done by Chinnaiyan S et al². Knowledge about wound toileting with soap and water was low which was consistent with the study done by Ichchujani R L et al¹².

Conclusion

Maximum people believed that dogs are the most common cause of Rabies, followed by monkeys. The general idea about the first aid was low but majority of the respondents believed that treatment in hospital was necessary. The various myths which are still present need to be addressed.

Recommendations

The awareness about First Aid and PEP of Rabies can be increased by educating the community by various IEC methods. Some chapters or activities can be introduced in the school curriculum involving the students and the parents which will improve the awareness

level in the community against this dreadful disease. Control of stray dog population by ABC program must be initiated at a larger scale by the municipalities for the prevention of Rabies.

Financial and Conflicts of Interest

Nil

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APCRICON 2019
 21st National Conference of
 Association for Prevention and Control of Rabies in India
 Theme: "Strategies for Eliminating
 Dog mediated Human Rabies by 2030"
 Conference Dates: 6th & 7th July 2019
 Venue: RIMS, Ranchi, Jharkhand

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APCRICON 2019
 6th & 7th July 2019
 21st National Conference of
 Association for Prevention and Control of Rabies in India

Dear Colleagues,

Heartiest greetings from Rajendra Institute of Medical Sciences (RIMS), Ranchi, premier Institute of Jharkhand and one amongst eastern India. On behalf of the organizing committee, we take the pride in inviting you to the 21st National Conference of Association for Prevention and Control of Rabies in India (APCRICON 2019) to be held on 6th & 7th July 2019 at RIMS, Ranchi.

The theme of conference is "Strategies for Eliminating Dog mediated Human Rabies by 2030". We feel that this conference will act as a vital tool of reaching maximum people and spreading the knowledge and recent advancement in the field of Rabies and its control.

The conference will provide you with the best of scientific deliberations, cultural programmes, scenic beauty, culinary delights of Jharkhand and much more.

Looking forward to welcome you all to APCRICON 2019 at Ranchi, Jharkhand.

Association for Prevention and Control of Rabies in India (APCRI) is the pioneer organization established to serve as a glimmer of hope for the control of Rabies in India. APCRI was founded on Friday the 17th of April 1998. APCRI serves as a platform that brings together the best minds in the country comprising of medical professionals, public health personnel, veterinary doctors and others for Advocacy, Research & Information dissemination about prevention & control of Rabies.

Registration Details

Type of Delegates	Up to 15th March 2019	Up to 30th June 2019	Spot Registration*
Life APCRI Member	2500	3000	3500
Non Member	3000	3500	4000
PG Students**	1500	2000	2500
Co-Delegate**	1500	2000	2500

*Certificate from HOD is mandatory
 **No conference kit

For all details, kindly visit our conference site:
www.apcricon2019.com

Delegate fees to be paid in DD/NEFT/WCS/IMPS in favour of:
"APCRICON2019",
 A/C No. 5020034296347, HDFC Bank,
 Bariyatu Branch, Ranchi-834009.
 IFSC Code: HDFC0007728

Instructions for abstract Submission

Registration for the conference is mandatory to send the abstract, except for invitee speakers.

Each delegate is entitled to submit only one paper.

Abstracts of scientific paper presentations should be submitted online through conference website only. Abstracts should not be more than 250 words. It should be written in the following order: Title, Background, Objectives, Methodology, Results & Conclusion. Abstract without results & conclusion will not be considered for oral presentation.

Last date for abstract submission is 31st May, 2019.

The Scientific Committee will review the papers and finalize the mode of presentation. The accepted abstracts & the mode of presentation will be intimated.

Attractions

Preconference CME - Recent advances in Rabies and its control.
 Date: 5th July 2019, Time: 10.00 am to 4.00 pm
 Venue: Conference Hall, Paying ward, Ground Floor, RIMS, Ranchi

Scientific deliberations from eminent speakers from WHO, CDC Atlanta, NCDC, New Delhi, renowned institutions and other humanitarian organizations working on Rabies.

Prestigious Awards: Louis Pasteur Oration award, Dr. S N Madhusudan Oration award, Young Scientist award, Life time achievement award and paper presentation award.

Association for Prevention & Control of Rabies in India

Guidelines for applying for “Young Scientist Award”

1. The applicant can either be a Medical or Veterinary person with a post graduate degree or diploma.
2. Age of applicant should not be more than 40 years as on 1st July of the conference year.
3. Application with full details of the research work in the field of Rabies should not be submitted to Secretary General, APCRI*(in a sealed cover) on or before 31st May through head of the institution where he / she has completed the research work.
4. Research work(s) carried out as a project or a scheme or departmental research or Post Graduation research are eligible for consideration.
5. The research should have been carried out during the preceding 5years.
6. The research should have been carried out in India.
7. Evidence of age (Date of Birth) should be enclosed along with the application.
8. Only life members of APCRI are eligible to apply for the award.
9. The Award committee of APCRI reserves the right to defer the award if suitable candidates are not available in the particular year and the decision of the committee will be final.
10. The award carries a cash prize (paid by Demand Draft) of Rs. 5,000.00, a citation & a certificate which will be given during the conference.
11. One award will be given per year.
12. The young scientist who applies and gets the award shall make the presentation of his/her research work during the Annual National Conference of APCRI during the same year. He/ She will be given Travel (2 tier AC train) fare & an amount of Rs. 3000.00 towards accommodation & incidentals.

Association for Prevention & Control of Rabies in India (APCRI)

Application for “Young Scientist Award”

1. Name: _____
2. Date of Birth & Age: _____ Yrs. _____ 3. Sex: _____
4. Institutional Address: _____

5. Qualification(s): _____
6. Present designation: _____
7. Phone Nos:(Office): _____ (Res): _____ Mobile: _____
8. Fax: _____ 9. Email (s): _____
10. Topic of research(s) work undertaken (enclose only details of work done in the field of rabies): _____

11. Place & year during which research was undertaken: _____

12. Training undergone (relevant to rabies): _____
13. Total years of Experience: _____ Training: _____ Research: _____
14. Awards/ Medals/ Fellowship received (enclose copies): _____

15. Total number of research papers published (relevant to rabies): _____
National Journals _____, International Journals: _____
16. Any other information in support of research work: _____

(Signature of the applicant)

(Signature & Seal of Head of the Department)

(Signature & Seal of the Head of the Institution)

- Note:**
- 1) Submit an attested copy of proof of your age (10th std. marks card/etc.)
 - 2) Submit a copy of the research work done for claiming the award

INSTRUCTIONS TO AUTHOR

About the Journal

APCRI Journal is the official Journal of Association for Prevention and Control of Rabies in India. It is a peer-reviewed international journal and published biannually. Its ISSN is 0973-5038. It is Indexed in Index Copernicus International. The journal allows free access (Open Access) to its contents and permits authors to self-archive final accepted version of the articles. The journal's full text is available online at www.apcrijournal.com

Scope of the journal

The Association for Prevention and Control of Rabies in India publishes articles of authors from India and abroad with special emphasis on original research findings that are relevant for developing country perspectives including India. The journal considers publication of articles as Original Articles, Review Articles, Brief Reports, Case Reports, Letters to the Editor, Personal Viewpoint, Notes and News for APCRI Journal and News Letter etc.

The Editorial Process

A manuscript will be reviewed for possible publication with the understanding that it is being submitted to APCRI Journal alone at that point in time and has not been published anywhere, simultaneously submitted, or already accepted for publication elsewhere. The journal expects that authors would authorize one of them (corresponding author) to correspond with the Journal for all matters related to the manuscript. All manuscripts received are duly acknowledged. On submission, editors review all submitted manuscripts initially for suitability for formal review. Manuscripts with insufficient originality, serious scientific or technical flaws, lack of a significant message, and lack of rabies expertise or not conforming to the journal norms are rejected before proceeding for formal peer-review.

Manuscripts that are found suitable for formal review are sent to two or more expert reviewers. During submission, the contributor is requested to provide names of at least two qualified reviewers who have experience in the subject of the submitted manuscript and are not associated as contributor/s, but this is not mandatory. However, the selection of the reviewers is at the sole discretion of the editor/ managing editor. The journal follows a double-blind review process, wherein the reviewers and authors are unaware of each other's identity. Based on the comments from the reviewers the editorial team takes a final decision on the manuscript. The comments and suggestions (acceptance/ rejection/ amendments in manuscript) received from reviewers are conveyed to the corresponding author. If required, the author is requested to provide a point by point response to reviewers' comments and submit a revised version of the manuscript. This process is repeated till reviewers and editors are satisfied with the manuscript.

Manuscripts accepted for publication are copy edited for grammar, punctuation, print style, and format. Page proofs are sent to the corresponding author. The corresponding author is expected to return the corrected proofs within three days. It may not be possible to incorporate corrections received after that period. The whole process of submission of the manuscript to final decision and sending and receiving proofs is completed online. With a view to achieve faster and greater dissemination of knowledge and information the journal will try to publish articles online as 'Ahead of Print' after the articles have been accepted for publication.

Authorship Criteria

Authorship credit should be based only on substantial contributions to each of the three components mentioned below:

1. Concept and design of study or acquisition of data or analysis and interpretation of data.
2. Drafting the article or revising it critically for important intellectual content; and
3. Final approval of the version to be published.

Each contributor should have participated sufficiently in the work to take rabies as responsibility for appropriate portions of the content of the manuscript. Once submitted the order cannot be changed without written consent of all the contributors. The journal prescribes a maximum number of authors for manuscripts depending upon the type of manuscript, its scope and number of institutions involved (vide infra). The authors should provide a justification, if the number of authors exceeds these limits, in exceptional cases.

Contribution Details

Contributors should provide a description of contributions made by each of them towards the manuscript. Description should be divided in following categories, as applicable: concept, design, definition of intellectual content, literature search, clinical studies, experimental studies, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing and manuscript review. One or more author should take responsibility for the integrity of the work as a whole from inception to published article and should be designated as 'guarantor'.

Conflicts of Interest/ Competing Interests

All authors must disclose any and all conflicts of interest they may have with publication of the manuscript or an institution or product that is mentioned in the manuscript and/or is important to the outcome of the study presented. Authors should also disclose conflict of interest with products that compete with those mentioned in their manuscript.

Clinical trial registry

APCRI Journal favors registration of clinical trials and is a signatory to the Statement on publishing clinical trials in Indian biomedical journals. APCRI Journal would publish clinical trials that have been registered with a clinical trial registry that allows free online access to public.

Submission of Manuscripts

All manuscripts must be submitted on-line through the website <http://www.apcrijournal.com/ArticleSubmission.aspx>. First time users will have to register at this site. Registration is free but mandatory. Registered authors can keep track of their articles after logging into the site using their user name and password. If you experience any problems, please contact the editorial office by e-mail at Admin@apcrijournal.com. The submitted manuscripts that are not as per the "Instructions to Authors" would be returned to the authors for technical correction, before they undergo editorial/ peer-review. Generally, the manuscript should be submitted in the form of two separate files:

1) Title Page/First Page File/covering letter:

This file should provide

- a. The type of manuscript (original article, brief research article, case series report, review article, Letter to editor, Images, etc.) title of the manuscript, running title, names of all authors/ contributors (with their highest academic degrees, designation and affiliations) and name(s) of department(s) and/ or institution(s) to which the work should be credited. All information which can reveal your identity should be here. Use .doc/docx files. Do not zip the files.

- b. Source(s) of support in the form of grants, equipment, drugs, or all of these;
 - c. Acknowledgement, if any. One or more statements should specify 1) contributions that need acknowledging but do not justify authorship, such as general support by a departmental chair; 2) acknowledgments of technical help; and 3) acknowledgments of financial and material support, which should specify the nature of the support. This should be included in the title page of the manuscript and not in the main article file.
 - d. Registration number in case of a clinical trial and where it is registered (name of the registry and its URL)
 - e. Conflicts of Interest of each author/ contributor. A statement of financial or other relationships that might lead to a conflict of interest, if that information is not included in the manuscript itself or in an authors' form
 - f. A statement that the manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work, if that information is not provided in another form (see below); and
 - g. The name, address, e-mail, and telephone number of the corresponding author, who is responsible for communicating with the other authors about revisions and final approval of the proofs, if that information is not included on the manuscript itself.
- 2) Blinded Article file:** The manuscript must not contain any mention of the authors' names or initials or the institution at which the study was done or acknowledgements. Page headers/running title can include the title but not the authors' names. Manuscripts not in compliance with The Journal's blinding policy will be returned to the corresponding author. The main text of the article, beginning from Abstract till References (including tables) should be in this file. Use rtf/doc files. Do not zip the files. Limit the file size to 1024 kb (1 MB). Do not incorporate images in the file. The pages should be numbered consecutively, beginning with the first page of the blinded article file.
- 3) Images:** Submit good quality color images. Each image should be less than 4 MB in size. Size of the image can be reduced by decreasing the actual height and width of the images (keep up to 1800 x 1600 pixels or 5-6 inches). JPEG is the most preferred format to upload images. Images can be submitted as jpeg files. Do not zip the files. Legends for the figures/images should be included at the end of the article file. Maximum 5 images per document is allowed to be uploaded.
- 4)** The contributors' / copyright transfer form (template provided below) has to be submitted in original with the signatures of all the contributors or email (Admin@apcrijournal.com, as a scanned image. The hard copies of the Contributors' form / copyright transfer form may be submitted online from the authors' area on <http://www.apcrijournal.com/ArticleSubmission.aspx>
- 5)** Documents of clearance by Institutional Ethics Committee or equivalent should also be sent as scanned image with first page file.

Preparation of Manuscripts

Manuscripts must be prepared in accordance with "Uniform requirements for Manuscripts submitted to Biomedical Journals" developed by the International Committee of Medical Journal Editors (October 2006). The uniform requirements and specific requirements of Association for Prevention and Control of Rabies in India are summarized below. Before submitting a manuscript, contributors are requested to check for the latest instructions available. Instructions are also available from the official website of the Association for Prevention and Control of Rabies in India (<http://www.apcrijournal.com>) and from the manuscript submission site (<http://www.apcrijournal.com/ArticleSubmission.aspx>).

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It is the responsibility of authors/ contributors to obtain permissions for reproducing any copyrighted material. A copy of the permission obtained must accompany the manuscript. Copies of any and all published articles or other manuscripts in preparation or submitted elsewhere that are related to the manuscript must also accompany the manuscript. The material should be sent to the address as follows Editor / Secretary General, **APCRI, 56H, Beliaghata Main Road Kolkata-700010, West Bengal, India**

Original articles:

These include population based surveys, program evaluations, impact assessment studies, randomized controlled trials, intervention studies, studies of screening and diagnostic test, outcome studies, cost effectiveness analyses, meta-analysis, systematic reviews, cohort studies and case-control studies,. The text of original articles amounting to up to 3000 words (excluding Abstract, references and Tables) should be divided into sections with the headings Abstract, Key-words, Introduction, Material and Methods, Results, Discussion, References, Tables and Figure legends. Abstract should be structured, not more than 250 words, briefly mentioning background, objectives, methods, results and conclusion.

Introduction:

State the purpose and summarize the rationale for the study or observation.

Materials and Methods:

It should include and describe the following aspects:

Ethics: The journal will not consider any paper which is ethically unacceptable. A statement on ethics committee permission and ethical practices must be included in all research articles under the 'Materials and Methods' section. When reporting studies on human beings, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at http://www.wma.net/e/policy/17-c_e.html). For prospective studies involving human participants, authors are expected to mention about approval of (regional/ national/ institutional or independent) Ethics Committee or Review Board, obtaining informed consent from adult research participants and obtaining assent for children aged over 7 years participating in the trial. The age beyond which assent would be required could vary as per regional and/ or national guidelines. Ensure confidentiality of subjects by desisting from mentioning participants' names, initials or hospital numbers, especially in illustrative material. When reporting experiments on animals, indicate whether the institution's or a national research council's guide for, or any national law on the care and use of laboratory animals was followed.

The ethical standards of experiments must be in accordance with the guidelines provided by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) and World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Humans for studies involving experimental animals and human beings, respectively).

These articles generally should not have more than six authors.

Review Articles:

It is expected that these articles would be by invitation, written by individuals who have done substantial work on the subject or are considered experts in the field. Articles by other rabies experts can be accepted on the basis of merit of article. A short summary of the work done by the contributor(s) in the field of review/their area of expertise should accompany the manuscript.

The prescribed word count is up to 3000 words excluding tables, references and abstract. The manuscript may have about 90 references. The manuscript should have an unstructured summary (250 words) representing an accurate summary of the article. The section titles would depend upon the topic reviewed. Authors submitting review article should include a section describing the methods used for locating, selecting, extracting, and synthesizing data. These methods should also be summarized in the abstract. Restrict the maximum number of tables and or/ figures to four. The journal expects the contributors to give post-publication updates on the subject of review. The update should be brief, covering the advances in the field after the publication of the article and should be sent as a letter to editor, as and when major development occurs in the field.

Review articles could be authored by upto six authors.

Brief Research article

Brief Research article should contain interesting observations/ brief reports of original studies presenting the authors' views on a topic of current interest. The purpose of a brief research article in APCRI Journal is to provide additional insights into topics of current rabies concerns. It should be limited to 1,500 words with unstructured summary not exceeding 150 words, no more than two tables and/or figures, and no more than 10 references. It could be authored by up to six authors.

Ethical consideration as per original article should be followed.

Case Studies/ Case Series Report:

New, interesting and intriguing case studies can be reported. They should be unique and have demonstrated methods to overcome any rabies challenge by use of novel tools and techniques and provide a learning point for the readers. Case studies with rabies significance or implications will be given priority.

These communications could be of up to 1000 words (excluding Abstract and references) and should have the following headings: Abstract (unstructured summary not exceeding 150 words), Key-words, Introduction, Case Report, Discussion, Reference, Tables and Legends in that order. It must not have more than 10 references.

Case Reports could be authored by up to four authors.

Letter to the Editor:

These should be short and decisive observations. They should preferably be related to articles previously published in the Journal or views expressed in the journal. They should not be preliminary observations that need a later paper for validation. The letter could have up to 500 words and 5 references. It could be generally authored by not more than four authors.

References:

References should be numbered consecutively in the order in which they are first mentioned in the text (not in alphabetic order). Identify references in text, tables, and legends by Arabic numerals in superscript after the punctuation marks. References cited only in tables or figure legends should be numbered in accordance with the sequence established by the first identification in the text of the particular table or figure. Use the style of the examples below, which are based on the formats used by the NLM in Index Medicus. The titles of journals should be abbreviated according to the style used in Index Medicus. Use complete name of the journal for non-indexed journals. Avoid using abstracts as references. Information from manuscripts submitted but not accepted/ published should be cited in the text as "unpublished observations" with written permission from the source. Avoid citing a "personal communication" unless it provides essential information not available from a public source, in which case the name of the person and date of communication should be cited in parentheses in the text.

Sending a revised manuscript

The revised version of the manuscript should be submitted online in a manner similar to that used for submission of the manuscript for the first time. However, there is no need to submit the “First Page” or “Covering Letter” file while submitting a revised version. When submitting a revised manuscript, contributors are requested to include, the ‘referees’ remarks along with point to point clarification at the beginning in the revised file itself. In addition, they are expected to mark the changes as underlined or colored text in the article.

Reprints and proofs

Journal provides no free reprints. Request for reprints may be made to the editorial office after acceptance of the articles for publication.

Manuscript submission, processing and publication charges

Right now there are no processing and publication charges.

Submission charge: Nil

Checklist

Covering letter

- Signed by all contributors
- Previous publication / presentations mentioned
- Source of funding mentioned
- Conflicts of interest disclosed

Authors

- Last name and given name provided along with Middle name initials (where applicable)
- Author for correspondence, with e-mail address and mobile number provided
- Number of contributors restricted as per the instructions
- Identity not revealed in paper except title page (e.g. name of the institute in Methods, citing previous study as ‘our study’, names on figure labels, name of institute in photographs, etc.)

Presentation and format

- Double spacing
- Margins 2.5 cm from all four sides
- Page numbers included at bottom
- Title page contains all the desired information
- Running title provided (not more than 50 characters)
- Abstract page contains the full title of the manuscript
- Abstract provided (unstructured summary of 250 words for review articles, structured abstract of about 250 words for original articles, unstructured summary of about 150 words for brief research article and case series report)
- Key words provided (three or more)
- Introduction of 75-100 words
- Headings in title case (not ALL CAPITALS)
- The references cited in the text should be after punctuation marks, in superscript .
- References according to the journal’s instructions, punctuation marks checked
- Send the article file without ‘Track Changes’

Language and grammar

- Uniformly American English
- Write the full term for each abbreviation at its first use in the title, abstract, keywords and text separately unless it is a standard unit of measure. Numerals from 1 to 10 spelt out
- Numerals at the beginning of the sentence spelt out
- Check the manuscript for spelling, grammar and punctuation errors
- If a brand name is cited, supply the manufacturer's name and address (city and state/country).
- Species names should be in italics

Tables and figures

- No repetition of data in tables and graphs and in text
- Actual numbers from which graphs drawn, provided
- Figures necessary and of good quality (colour)
- Table and figure numbers in Arabic letters (not Roman)
- Labels pasted on back of the photographs (no names written)
- Figure legends provided (not more than 40 words)
- Patients' privacy maintained (if not permission taken)
- Credit note for borrowed figures/tables provided
- Write the full term for each abbreviation used in the table as a footnote

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Or

To the Editor Dr. Kajal Krishna Banik

Email id- kajalbanik@gmail.com

To the Secretary General Dr. Sumit Poddar

Email id- drsumitpoddar@gmail.com

To the President Dr. D.H. Ashwath Narayana

Email Id- dhashwathnarayana@gmail.com

To the Treasurer Dr. Ravish H.S.

Email Id- drravishhs@rediffmail.com

**Please send your valuable comment,
feedback and queries to the Editor, APCRI**

ASSOCIATION FOR PREVENTION AND CONTROL OF RABIES IN INDIA (APCRI)

APPLICATION FORM

1. NAME (in Block Letters) : _____
2. DATE OF BIRTH & AGE : _____
3. GENDER : _____
4. OCCUPATION : _____
5. ADDRESS
 - a) For Communication : _____

 - b) Permanent Address : _____

Affix pasport
size photography

6. PHONE NUMBERS :

Office :
Residence (STD Code) :
Fax :
E-mail ID :

7. QUALIFICATION/S:

DEGREE/DIPLOMA	YEAR	UNIVERSITY	PLACE

8. WORK & EXPERIENCE (as related to Rabies)

DESIGNATION	PERIOD (DATES)	INSTITUTION / ORGANIZATION

9. PUBLICATIONS (ON RABIES) (Add additional pages, if inadequate)

	TITLE	YEAR	PUBLICATION
I			
II			
III			
IV			
V			

10. AWARDS, DISTINCTIONC, MEDALS, Etc...

	AWARDS Etc..	YEAR	DETAILS/PARTICULARS
I			
II			
III			
IV			
V			



11. MEMBERSHIP/ FELLOWSHIPS OF OTHER PROFESSIONAL BODIES/SCIENTIFIC SOCIETIES, Etc....

	MEMBERSHIP/ FELLOWSHIP	SOCIETY/ ORGANIZATIONAL BODIES	YEAR	ADDRESS
1				
2				
3				
4				
5				

12. ANY OTHER INFORMATION : _____

(A copy of Curriculum Vitae may be enclosed)

Declaration: I hereby agree to abide by the rules and regulation of the association and will pay all the prescribed fee in time and work for the welfare of the association.

Date: _____

Signature: _____

Place: _____

Name: _____

RECOMMENDATION OF APCRI MEMBERS

Proposed By:

Seconded By:

Signature : _____

Signature : _____

Name & Address _____

Name & Address _____

OFFICE USE

APPROVED BY:

TREASURER

GENERAL SECRETARY

PRESIDENT

{Life Membership No:.....}

Date :.....

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NOTE

The application form duly filled up and signed, (along with photograph affixed), copies of Degree/ P.G. Degree Certificates and D.D. for Rs.2000/- should be sent to

Dr. H. S. Ravish
 Treasurer, APCRI, Associate Professor of Community Medicine
 KIMS Medical College, Banashankari 2nd stage, Bangalore-560070
 Mobile: 09900562743

Important: All payments should be made by D.D. only favouring "APCRI" and payable at Bangalore



Association for Prevention and Control of Rabies in India

APCRI Headquarters: Department of Community Medicine, Kempegowda Institute of Medical Sciences (KIMS), Banashankari 2nd Stage, Bangalore - 560070, India. Email: info@apcri.org

Sub: Issuance of Identity Card & Changing of Corresponding Details (if any)

Dear Sir /Madam,

It is our proud privilege to inform you that on behalf of APCRI we will issue Identity Card to our members and update their corresponding details (if any) in APCRI database.

You are requested to send the following PROFORMA within two months to the undersigned or any of the honorable E.C. members so that we may issue Identity Card at the earliest.

Dr. Sumit Poddar

The Secretary General

Association for Prevention and Control of Rabies in India (APCRI)

56/H, Beliaghata Main Road, Calcutta - 700 010

Ph. No.: 033-23706644/23539586

Email: drsumitpoddar@gmail.com

Application for Issuance of Identity Card & Changing of Corresponding Details (PLEASE USE CAPITAL LETTERS)

APCRI MEMBERSHIP NUMBER: _____

NAME: _____

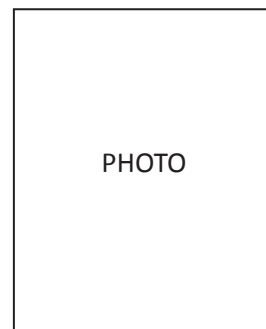
AGE: _____ SEX: _____ BLOOD GROUP: _____

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TEL NO. (IF ANY): _____

EMAIL ID: _____



SIGNATURE



ASSOCIATION FOR PREVENTION & CONTROL OF RABIES IN INDIA (APCRI)

The Association for Prevention & Control of Rabies in India (APCRI) was founded on 17th April, 1998 and is registered as a scientific society under the Karnataka Societies Act S-No 439, 2000-01. It is an association of professionals, scientists and others who are committed to the elimination of rabies from India.

1. Annual Conference on 6th July (World Zoonosis Day) or near about (on Saturday and Sunday only) :

Kolkata (1999), Bangalore (2000), Amritsar (2001), Jaipur (2002), Bhubaneswar (2003), Kolkata (2004), Shimla (2005), Jammu (2006), Hyderabad (2007), Lucknow (2008), Thiruvananthapuram (2009), New Delhi (2010), Chennai (2011), Kolkata (2012), Pune (2013), Mysore (2014), Hyderabad (2015), Bangalore (2016), Goa (2017) and New Delhi (2018).

2. Workshops, Seminars & Training Programmes:

- National workshop for APCRI trainers in modern WHO approved rabies prophylaxis at NIMHANS, Bangalore (2001).
- National seminar on “**Intradermal Rabies Vaccination**”, KIMS, Bangalore (2003).
- National workshop on “**Developing guidelines for Rabies Prophylaxis**” at Hyderabad (2006).
- National workshop on “**Rabies Prophylaxis**” at Alleppey, Kerala (2006).
- National workshop on “**Rabies Immunoglobulin (RIG) Administration**” at KIMS, Bangalore (2008)
- National seminar on Rabies Vaccines: Important Issues, at Visakhapatnam (Vizag), Andhra Pradesh (1st March 2009).
- National workshop on Development of IEC Material on Prevention of Rabies for School Children and Public at Mysore, Karnataka (20th & 21st March 2010).
- National Seminar on “**Rabies Post Exposure Prophylaxis-Recommendations and Practices**” at New Delhi (17th March 2013).
- National Seminar on Rabies Prophylaxis (2014) at Delhi (26th April, 2014).

3. Publications: APCRI Journal (Biannual) & APCRI News Letter (Biannual).

4. WHO sponsored “National Multi-centric Indian rabies survey” (2004).

5. Award: APCRI was honoured with “Chiron vaccines award 2000” for its contributions to prevention and control of Rabies in India.

6. APCRI in association with Indian Academy of Paediatrics (IAP) and Rabies in Asia (RIA) Foundation, formulated the **IAP Guidelines for Rabies Prophylaxis in Children (2008)**.

7. Slides on “**Rabies Prophylaxis – Current Concepts & Recommendations**” prepared by an expert consultation (2001), revised in 2006 and now available on www.apcri.org.

8. Observed “World Rabies Day” on 8th September 2007, 28th September 2008, 28th September 2009, 28th September 2010, 28th September 2011, 28th September 2012, 28th September 2013, 28th September 2014, 28th September 2015, 28th September 2016, 28th September 2017, 28th September 2018 throughout the country.

9. WHO-APCRI survey on “Post Exposure Prophylaxis modalities in India (2007).

10. APCRI is regularly organizing **Zonal/ Regional Conference & CME Programmes**.

11. APCRI played a major role in implementation of **Intradermal Rabies Vaccination (IDRV)** in the country.

12. **Manual on Rabies Immunoglobulin (RIG) Administration** published in February 2009.

13. **APCRI Educational Portal** in 2010. The Site can be visited at edu.apcri.org.

14. **APCRI-TATA Project on Rabies Control** in Jamshedpur.

15. Conducted **CME’S, Workshops and Training Programmes** throughout the country.

16. Conducted **WHO-APCRI Survey Report 2017**, sponsored by WHO

17. Observed **World Rabies Day** on 28th September, in Ranchi RIMS with posters, sit and draw in 2018.

18. Introduced Louis Pasteur Oration, Lifetime Achievement Award, Dr. SN Madhusudana Oration, Young Scientist Award and Certificate of Merit Award regularly in every conference.

RABIES Zero deaths by 2030

99% human cases from dog bites

One death every 15 minutes worldwide

4 out of 10 deaths are in children

100% vaccine preventable

no bite no rabies

VACCINATE TO STOP TRANSMISSION

VACCINATE TO SAVE LIVES

learn how to interact

World Health Organization

APCRI

The infographic features a central world map with a blue arrow pointing upwards from 'TODAY' to '2030'. The left side contains statistics and icons: a dog for 99% human cases, a skull for one death every 15 minutes, and a family silhouette for 4 out of 10 deaths in children. The right side shows icons for vaccination: a dog with a syringe, a person with a syringe, and a dog interacting with a person. Logos for the World Health Organization and APCRI are at the bottom.

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