

Research Article

The Effect of Lockdown on Patients of Animal Bites coming to the Anti-rabies Clinic of JLN Medical College and Hospital, Ajmer, Rajasthan

Renu Bedi¹, Kalpana Meena², Aleefah KS³, Moksharathi Sharma⁴, Vinod Kumar Saini⁵

¹Senior Professor & Head, ^{2,5}3rd Year PG Student, ^{3,4}2nd Year PG Student, Department of Community Medicine, Jawaharlal Nehru Medical College, Ajmer, India.

DOI: <https://doi.org/10.24321/0973.5038.202304>

I N F O

Corresponding Author:

Kalpana Meena, Department of Community Medicine, Jawaharlal Nehru Medical College, Ajmer, India.

E-mail Id:

kalpanapabari10@gmail.com

Orcid Id:

<https://orcid.org/0000-0003-4695-4566>

How to cite this article:

Bedi R, Meena K, Aleefah KS, Sharma M, Saini VK. The Effect of Lockdown on Patients of Animal Bites coming to the Anti-rabies Clinic of JLN Medical College and Hospital, Ajmer, Rajasthan. APCRI J. 2023;25(1):20-27.

Date of Submission: 2023-02-27

Date of Acceptance: 2023-04-17

A B S T R A C T

Background: A pandemic (COVID-19) was caused by the SARS-CoV-2 virus which affected the entire world. COVID-19 is a contagious disease, therefore, many countries imposed lockdowns which affected healthcare services everywhere.

Objective: We compared the anti-rabies vaccination trends during the lockdown period of 2020 with those in the same duration of 2018 and 2019 in the anti-rabies clinic of JLNMC, Ajmer.

Methods and Materials: It was a retrospective analytical study. The study period was from Mar 22, 2020, to Jun 30, 2020. The cases of animal bites attending the anti-rabies clinic for ARV at JLNMC, Ajmer, Rajasthan in this period were compared with those in 2018 and 2019.

Results: The number of all anti-rabies vaccines administered was lower in April (731) and May (772) as compared to June (971) in 2020; anti-rabies serum administration was also lower in April (135) and May (170) as compared to June (209) in 2020. The number of cases of animal bites coming to the anti-rabies clinic was 2787 in 2020 which was almost 50% less than the cases in the same duration of 2018 (5138) and 2019 (5543).

Conclusion: During the period of lockdown, the number of cases of animal bites coming to the anti-rabies clinic was less in comparison to the same duration in 2018 and 2019 because of restricted movement and less exposure to street dogs. It may also be possible that reporting of cases of animal bites was less due to the lack of public transport and fear of COVID-19.

Keywords: Animal Bite, Anti-rabies Vaccine, Anti-rabies Serum, Lockdown, Pandemic, COVID-19

Introduction

Rabies is a deadly, however, preventable viral disease. It spreads to pets as well as human beings by a bite or scratch from a rabid animal. Its virus is commonly found in wild animals such as raccoons, foxes, bats, skunks, and dogs. Most of the deaths from rabies in human beings are a result of canine bites.¹ Still, rabies is the reason for extensive morbidity and mortality in India. It is endemic in India but Andaman & Nicobar and Lakshadweep Islands are exceptions. Human cases of rabies occur throughout the year all over India.

Dog bites are responsible for about 96% of morbidity and mortality due to rabies. Other carriers of the rabies virus in India are jackals, cats, monkeys, wolves, and mongooses. Bat rabies has no longer been conclusively stated in the country.² India is responsible for 35% of the global burden of rabies.³ The primary source of human infection in all countries where rabies is endemic is the dog which accounts for 96% of rabies in South East Asia.⁴ The annual expected range of dog bites in India is 17.4 million and 18,000-20,000 cases of human rabies are reported per year.⁵

A neurotropic virus belongs to the genus *Lyssavirus* and the family *Rhabdoviridae* is a causative agent of rabies. The rabies virion consists of a single-stranded negative-sense RNA, within a bullet-shaped two-layered envelope. The virus is transmitted mostly by bites of rabid animals through its introduction into wounds or cuts in the skin or mucous membranes.⁶

Post Exposure Prophylaxis (PEP) consists of a dose of anti-rabies serum (ERlg/ HRlg) and anti-rabies vaccine given on the day of the bite exposure (day 0), and then doses of vaccine given again on the 3rd, 7th, 14th, and 28th day for people who have never been vaccinated against rabies previously. Administration of HRlg/ ERlg and rabies vaccines should always be carried out. The combination of HRlg/ ERlg and anti-rabies vaccine is advised for bite cases and does not depend on the interval between exposure and the beginning of treatment. People who have been previously vaccinated or have been getting pre-exposure prophylaxis for rabies should receive only the anti-rabies vaccine.⁷

Cases of rabies are stagnant in India and under reported for a long time.⁸ Improvement in reporting systems is necessary to get accurate data along with its verification all over the country as the true burden of the disease is still not known because of poor reporting.⁹ Coronavirus (SARS-CoV-2) has caused a pandemic. It was discovered in Wuhan city of China, in December month of the year 2019.¹⁰ In India, a 21-day lockdown was announced on Mar 24, 2020.^{11,12} On Apr 14, the lockdown was extended until May 3rd by the Ministry of Home Affairs. Some conditional relaxations were given after April 20th for the regions where

the corona spread became minimal.¹³ Again on May 1st, the lockdown was extended by two weeks till May 17th by the Ministry of Home Affairs. Then again lockdown was extended till May 31st by the Ministry of Home Affairs.¹⁴

Suspension of all transports, air, rail, and road was done. Strict checkpoints were on state borders. The lockdown restricted people from coming out of their homes, except for emergencies. Public transport was closed within the city, and transportation was permitted only for emergency services. As a result, it was very difficult for patients to contact their doctors and reach health facilities.¹⁰ In this study, we compared the animal bite cases and anti-rabies vaccination during the lockdown period with those in the same duration of 2018 and 2019 in the anti-rabies clinic of JLNMC, Ajmer.

Materials and Methods

A retrospective study was conducted in the Department of Community Medicine, Anti-rabies Clinic of Jawaharlal Nehru Medical College, Ajmer, Rajasthan after due approval from the Institutional Ethics Committee. The study period was from Mar 22, 2020, to Jun 30, 2020, during the lockdown. All animal bite cases were included in this study after due consent. The cases of animal bites who came to the anti-rabies clinic for anti-rabies vaccination in this lockdown period were compared with those of the same duration in 2018 and 2019. Data were collected from the anti-rabies clinic records along with demography and other variables like category of bite, and type of animal and the results were tabulated.

Results and Discussion

Table 1 shows that for every year, the number of beneficiaries including males and females was higher in the age group of 0-10 years which was 890 (31.93%) cases out of a total of 2787 animal bite cases for the lockdown period. 1642 (31.96%) cases out of 5138 animal bite cases were seen for the same duration of the year 2018 and 1766 (31.98%) cases out of 5523 animal bite cases were seen for the same duration of the year 2019. Similar findings were presented in a study done by Ghosh et al.,¹⁵ in which it was observed that dog bites among children in the age group of less than 10 years were more as compared to other age groups. This may be due to the inability of children to deal with dogs as compared to adults resulting in more frequent bites.

Table 2 shows that a total (new + old) of 9544 (70.97%) animal bites were reported among males in these 3 years which was greater than the total (new + old) 3904 (29.03%) animal bites among females. The percentages of dog bites in males were 71.45% in 2018, 69.80% in 2019, and 72.41% in 2020 which were higher as compared to female cases, which were 28.55% in 2018, 30.20% in 2019 and 27.59% in 2020. It was observed that males have a higher rate of

animal bites than females. The findings were similar to those of studies done by Saleem et al.,¹⁶ Punguyire et al.,¹⁷ and Rudresh et al.¹⁸ in which they found a higher number of animal bites among males. This may be because during the lockdown period, for grocery purchases, men mainly went to market and during this process, they were more exposed to stray dogs who were probably underfed and starved as every animal was facing the effects of a complete lockdown. It was observed in this study that the gender distribution of animal bite cases was not affected by the lockdown. Table 2 also shows that the total number of animal bite cases during the lockdown period was 2787 which was less as compared to the same duration in 2018 (5138) and 2019 (5523). This is similar to a study done by Raynor et al.¹⁹ Number of animal bite cases reported were less during 2020 which can be due to restricted movement during the lockdown period, which caused less exposure of street dogs and less number of dog bite cases.

Table 3 shows that for the period of lockdown and for the same duration in 2018 and 2019, the number of category III animal bites including (new + old) was higher than that of category II and category I. The total numbers of category III bites were 2014 (676 new + 1338 old) during the period of lockdown, and 3694 (1223 new + 2471 old) and 3884 (1296 new + 2588 old) in the same duration in 2018 and 2019, respectively. Category II and category I bites were 761 (248 new + 513 old) and 12 (7 new + 5 old) for the period of lockdown, and 1611 (469 new + 1142 old) and 28 (10 new + 18 old), and 1424 (448 new + 976 old) and 20 (7 new + 13 old) in the same duration in 2018 and 2019, respectively. This fact resembles a study done by Gogtay et al.⁵ which showed that category III bites were more as compared to others. In our study, no effect of lockdown was observed on the category of animal bites.

Table 4 shows that animal bite cases from urban areas were 2198 for the period of lockdown, 4033 for the same duration of the year 2018, and 4297 for the same duration of the year 2019, which was higher as compared to animal bite cases from rural areas that were 589, 1105 and 1226 for the year of lockdown, 2018 and 2019 respectively. It was found that every year animal bite cases from the urban areas were more as compared to rural areas whereas, Sharma et al.²⁰ and Patel et al.²¹ observed more cases from the rural areas which can be explained as this study was conducted in an urban area.

Table 5 shows that the maximum numbers of animal bites reported every year were from dogs which were 2732 (98.03%), 4986 (97.04%), and 5362 (97.08%) for the period of lockdown, and in the same duration in 2018 and 2019 respectively. During the period of lockdown and unlock, the maximum number of animal bite cases were reported from dogs as compared to other animal bites (cat, monkey, pig,

horse). A similar finding of more dog bites was observed by Kapoor et al.²²

Table 6 shows animal bite cases who did not complete their treatment were 853 (30.61%) for the period of lockdown, 1132 (22.03%) for unlock period of 2018, and 1217 (22.04%) for unlock period of 2019. It was observed that the percentage of cases who did not complete their treatment was more in the period of lockdown than unlock period but overall, the number of cases who did not complete their treatment was less as compared to the number of cases with complete treatment. A similar finding was observed by Wadde et al.²³ according to which 41.81% of cases were defaulters and 58.19% completed their treatment.

Table 7 shows that only 1 case of hydrophobia was reported in the period of lockdown, while 8 cases were reported in the same duration of 2018 and 5 cases were reported in the same duration of 2019. It was found in this study that the number of hydrophobia cases was very less in the period of lockdown as compared to the period of unlock. This finding can be explained by the fact that during the period of lockdown, human and dog interaction was less which resulted in fewer dog bites and fewer hydrophobia cases.

Table 8 shows that the total number of beneficiaries who were administered anti-rabies vaccines was 2,787 in the period of lockdown, 5138 in the same duration of 2018, and 5,523 in the same duration of 2019, therefore a decreasing trend of anti-rabies vaccination was observed for the years 2018-2020 and 2019-2020.

Table 9 shows a decreasing trend of anti-rabies serum for the year 2018-2020 and 2019-2020. The total number of beneficiaries who were administered anti-rabies serum was 560 in the period of lockdown, 943 in the same duration of 2018 and 1,290 in the same duration of 2019.

Table 10 shows the vaccination association before and during the period of lockdown and in the same duration in 2018 and 2019 which was significant as the p value observed was less than 0.05. Overall, anti-rabies vaccination and serum coverage were less during the whole lockdown period as compared to the same duration of the years 2018 and 2019.

Figure 1 shows that less number of animal bite cases came to the anti-rabies clinic for treatment during the year of lockdown as compared to the same duration of years 2018 and 2019. It shows that a little surge in cases of animal bites was observed in the month of June of the lockdown year (2020) as compared to the months of March, April, and May which may be due to the less strict lockdown in June.

Limitations

It is a retrospective study, therefore, it is difficult to establish a causal association between lockdown and fewer dog bite

cases. The data were collected from one clinic in a hospital, therefore generalisability is poor.

Recommendations

It can be suggested that Municipal Corporations can play an important role in reducing animal bites by keeping street animals away from the general population by providing them shelter, food, and vaccination against rabies and other preventable diseases. Anti-rabies vaccination should be

made available at Municipal Corporation hospitals so that animal bite caseload at tertiary care centers can be reduced. Effective information, education and communication activities should be carried out regularly at healthcare facilities so that information about animal-related behavior for the prevention of bites from animals and the importance of wound management and anti-rabies vaccination can be given to the community.

Table 1. Age Group of (New + Old) Cases of Animal Bites coming to the Anti-rabies Clinic during the Lockdown Period and in the Same Duration in 2018 and 2019

Age Group (Years)	2018			2019			2020		
	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	Total n (%)	Male n (%)	Female n (%)	Total n (%)
0-10	1,174 (22.85)	468 (9.11)	1642 (31.96)	1233 (22.32)	533 (9.65)	1766 (31.98)	644 (23.11)	246 (8.83)	890 (31.93)
10-20	735 (14.31)	293 (5.70)	1028 (20.01)	771 (13.96)	329 (5.96)	1100 (19.92)	403 (14.46)	153 (5.49)	556 (19.95)
20-30	478 (9.30)	192 (3.74)	670 (13.04)	501 (9.07)	216 (3.91)	717 (12.98)	262 (9.40)	94 (3.37)	356 (12.77)
30-40	495 (9.63)	197 (3.83)	692 (13.47)	521 (9.43)	225 (4.07)	747 (13.53)	273 (9.80)	108 (3.88)	381 (13.67)
40-50	201 (3.91)	83 (1.62)	284 (5.53)	212 (3.84)	94 (1.70)	306 (5.54)	112 (4.02)	43 (1.54)	155 (5.56)
50-60	330 (6.42)	132 (2.57)	462 (8.99)	347 (6.28)	153 (2.77)	500 (9.05)	183 (6.57)	72 (2.58)	255 (9.15)
> 60	258 (5.02)	102 (1.99)	360 (7.01)	270 (4.89)	118 (2.14)	388 (7.03)	141 (5.06)	53 (1.90)	194 (6.96)
Total	3671 (71.45)	1467 (28.55)	5138 (100.0)	3855 (69.80)	1668 (30.20)	5523 (100.0)	2018 (72.41)	769 (27.59)	2787 (100.0)

Table 2. Gender of (New + Old) Cases of Animal Bites coming to Anti-rabies Clinic during the Lockdown Period and in the Same Duration of 2018 and 2019

Years	Gender				Total N
	Male n (%)		Female n (%)		
	New	Old	New	Old	
2018	1254 (24.40)	2417 (47.04)	474 (9.23)	993 (19.33)	5138
2019	1269 (22.98)	2586 (46.82)	559 (10.12)	1109 (20.08)	5523
2020	724 (25.98)	1294 (46.43)	287 (10.30)	482 (17.29)	2787
Total N (%)	3247 (24.14)	6297 (46.82)	1320 (9.82)	2584 (19.21)	13448

Table 3. Category of (New + Old) Animal Bites of Cases coming to the Anti-rabies Clinic during the Lockdown Period and in the Same Duration of 2018 and 2019

Years	Category of Bites						Total N
	I		II		III		
	New n (%)	Old n (%)	New n (%)	Old n (%)	New n (%)	Old n (%)	
2018	7 (0.14)	13 (0.25)	448 (8.72)	976 (18.99)	1223 (23.80)	2471 (48.09)	5138

2019	10 (0.18)	18 (0.33)	469 (8.49)	1142 (20.68)	1296 (23.47)	2588 (46.86)	5523
2020	7 (0.25)	5 (0.18)	248 (8.90)	513 (18.40)	676 (24.26)	1338 (48.01)	2787
Total N (%)	24 (0.18)	36 (0.27)	1165 (8.66)	2631 (17.56)	3195 (23.76)	6397 (47.57)	13448

Table 4. Distribution of Cases according to Rural/Urban Area during the Lockdown Period and in the Same Duration of 2018 and 2019

Years	Rural n (%)	Urban n (%)	Total N
2018	1105 (21.51)	4033 (78.49)	5138
2019	1226 (22.20)	4297 (77.80)	5523
2020	589 (21.13)	2198 (78.87)	2787
Total N (%)	2920 (21.71)	10528 (78.29)	13448

Table 5. Distribution of Cases according to the Type of Animal that caused Exposure during the Lockdown Period and in the Same Duration in 2018 and 2019

Years	Dog n (%)	Cat n (%)	Monkey n (%)	Pig n (%)	Other n (%)	Total N
2018	4986 (97.04)	95 (1.85)	32 (0.62)	8 (0.16)	17 (0.33)	5138
2019	5362 (97.08)	81 (1.47)	40 (0.72)	6 (0.11)	34 (0.62)	5523
2020	2732 (98.03)	43 (1.54)	8 (0.29)	2 (0.07)	2 (0.07)	2787
Total N (%)	13,080 (97.26)	219 (1.63)	80 (0.59)	16 (0.12)	53 (0.39)	13448

Table 6. Distribution of Cases with Complete/ Incomplete Treatment during the Lockdown Period and in the Same Duration in 2018 and 2019

Years	Number of Cases with Incomplete Treatment n (%)	Number of Cases with Complete Treatment n (%)	Total N
2018	1132 (22.03)	4006 (77.97)	5138
2019	1217 (22.04)	4306 (77.96)	5523
2020	853 (30.61)	1934 (69.39)	2787
Total N (%)	3202 (23.81)	10246 (76.19)	13448

Table 7. Number of Cases of Hydrophobia reported during the Lockdown Period and in the Same Duration in 2018 and 2019

Years	March	April	May	June
2018	0	1	4	3
2019	3	1	1	0
2020	0	1	0	0

Table 8. Anti-rabies Vaccine Trends during the Lockdown and Unlock Periods

ARV (n) March 2018	ARV (n) March 2019	ARV (n) March 2020	Trend (2018-2020)	Trend (2019-2020)
670	701	313	53.28%↓	55.35%↓
ARV (n) April 2018	ARV (n) April 2019	ARV (n) April 2020	Trend (2018-2020)	Trend (2019-2020)
1588	1720	731	53.97%↓	57.5%↓
ARV (n) May 2018	ARV (n) May 2019	ARV (n) May 2020	Trend (2018-2020)	Trend (2019-2020)
1510	1641	772	48.87%↓	52.95%↓

ARV (n) June 2018	ARV (n) June 2019	ARV (n) June 2020	Trend (2018-2020)	Trend (2019-2020)
1370	1461	971	36.93%↓	33.54%↓

Data for March month were taken from March 22nd-31st, 2020 as the lockdown started on March 22nd, n is the number of doses, ARV: Anti-rabies Vaccine

Table 9. Anti-rabies Serum Trends during the Lockdown and Unlock Periods

ARS (n) (March 2018)	ARS (n) (March 2019)	ARS (n) (March 2020)	Trend (2018-2020)	Trend (2019-2020)
103	169	46	55.34%↓	72.78%↓
ARS (n) (April 2018)	ARS (n) (April 2019)	ARS (n) (April 2020)	Trend (2018-2020)	Trend (2019-2020)
300	399	135	55.00%↓	66.16%↓
ARS (n) (May 2018)	ARS (n) (May 2019)	ARS(n) (May 2020)	Trend (2018-2020)	Trend (2019-2020)
280	371	170	39.28%↓	54.18%↓
ARS (n) (June 2018)	ARS (n) (June 2019)	ARS (n) (June 2020)	Trend (2018-2020)	Trend (2019-2020)
260	351	209	19.61%↓	40.45%↓

Data for March month were taken from March 22nd-31st, 2020 as the lockdown started on March 22nd, n is the number of sera, ARS: Anti-rabies Serum

Table 10. Vaccination Before and During COVID Lockdown Period

Months	Duration	ARV		ARS	
		Chi-square	p Value	Chi-square	p Value
March	2018-2020	129.653	< 0.001	21.805	< 0.001
April	2018-2020	316.709	< 0.001	62.586	< 0.001
May	2018-2020	238.670	< 0.001	26.889	< 0.001
June	2018-2020	68.006	< 0.001	5.546	0.019
March	2019-2020	157.773	< 0.001	70.367	< 0.001
April	2019-2020	399.070	< 0.001	130.517	< 0.001
May	2019-2020	312.955	< 0.001	74.678	< 0.001
June	2019-2020	98.725	< 0.001	36.007	< 0.001

ARV: Anti-rabies Vaccine, ARS: Anti-rabies Serum

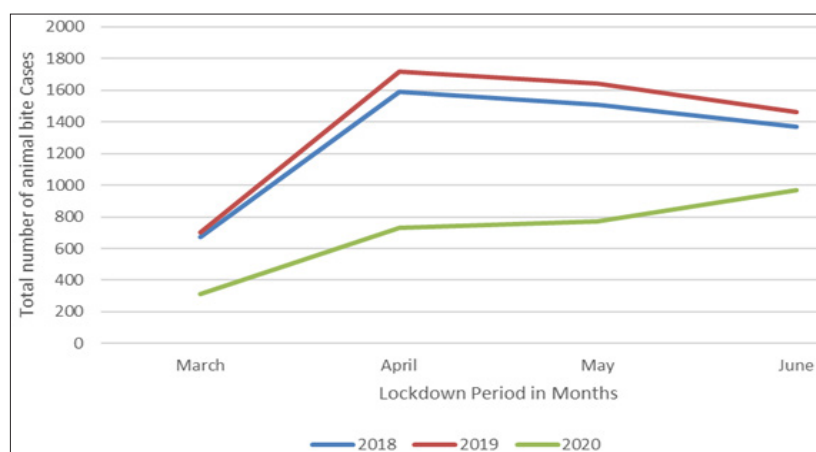


Figure 1. Animal Bite Cases in March, April, May, and June Months of Lockdown (2018-2020)

Conclusion

Our study concluded that the total number of cases of animal bites coming to the anti-rabies clinic during the lockdown period was less as compared to the same duration of the year 2018 and 2019 which may be due to less exposure to street dogs and other animals in presence of strict movement of people and transportation.

Source of Funding: None

Conflict of Interest: None

References

- Centers for Disease Control and Prevention [Internet]. Rabies; [cited 2022 Jan 18]. Available from: <https://www.cdc.gov/rabies/index.html>
- National Centre for Disease Control (NCDC) [Internet]. National Rabies Control Programme; [cited 2022 Apr 24]. Available from: <https://ncdc.gov.in/index1.php?lang=1&level=1&sublinkid=146&lid=150>
- John D, Royal A, Bharti O. Burden of illness of dog-mediated rabies in India: a systematic review. *Clin Epidemiol Global Health*. 2021 Oct 1;12:100804. [Google Scholar]
- Kulkarni SK. Trend of animal bite victims reported to anti rabies vaccination clinic at a tertiary care hospital Nanded Maharashtra. *IOSR J Dent Med Sci* [Internet]. 2016 [cited 2022 Jan 20];15(11):2015-6. Available from: <https://www.iosrjournals.org/iosr-jdms/papers/Vol15-Issue%2011/Version-3/H1511033639.pdf>
- Gogtay NJ, Nagpal A, Mallad A, Patel K, Stimpson SJ, Belur A, Thatte UM. Demographics of animal bite victims & management practices in a tertiary care institute in Mumbai, Maharashtra, India. *Indian J Med Res* [Internet]. 2014 [cited 2022 Jan 18];139(3):459. Available from: <https://pubmed.ncbi.nlm.nih.gov/24820842/> [PubMed] [Google Scholar]
- Lembo T [Internet]. Recommendations of the OIE Global Conference on rabies control; 2014 [cited 2022 Jan 19]. Available from: <https://caninerabiesblueprint.org/Recommendations-of-the-OIE-Global>
- Centers for Disease Control and Prevention [Internet]. Rabies Postexposure Prophylaxis (PEP); [cited 2022 Jan 22]. Available from: https://www.cdc.gov/rabies/medical_care/index.html
- Kole AK, Roy R, Kole DC. Human rabies in India: a problem needing more attention. *Bull World Health Organ* [Internet]. 2014 [cited 2022 Jan 20];92(4):230. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3967582/> [PubMed] [Google Scholar]
- Sudarshan MK, Narayana DH. Background paper for developing a policy for the use of rabies biologicals and vaccination of humans in India. *Indian J Public Health*. 2019;63:S51-3. [PubMed] [Google Scholar]
- Gera A, Singh A, Sungadhi N, Aggarwal N, Gera R. Impact of COVID-19 pandemic on the pediatric services of a tertiary care hospital in North India: a retrospective review. *Indian J Child Health*. 2020;7(9):371-4. [Google Scholar]
- Moris D, Schizas D. Lockdown during COVID-19: the Greek success. *In Vivo* [Internet]. 2020 Jun [cited 2021 Jan 6];34(3 Suppl):1695-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/32503831/> [PubMed] [Google Scholar]
- Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, Khosrawipour T. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *J Travel Med* [Internet]. 2020 May 18 [cited 2021 Jan 6];27(3). Available from: <https://pubmed.ncbi.nlm.nih.gov/32181488/> [PubMed] [Google Scholar]
- Mint [Internet]. India to remain closed till 3 May, economy to open up gradually in lockdown 2.0; 2020 Apr 14 [cited 2022 Apr 24]. Available from: <https://www.livemint.com/news/india/pm-modi-announces-extension-of-lockdown-till-3-may-11586839412073.html>
- The Tribune India [Internet]. Centre extends nationwide lockdown till May 31, new guidelines issued; 2020 May 18 [cited 2022 Apr 24]. Available from: <https://www.tribuneindia.com/news/nation/centre-extends-nationwide-lockdown-till-may-31-new-guidelines-issued-86042>
- Ghosh A, Pal R. Profile of dog bite cases in an urban area of Kolkata, India. *Natl J Community Med* [Internet]. 2014 [cited 2022 May 2];5(3):321-4. Available from: https://www.researchgate.net/publication/344849691_profile_of_dog_bite_cases_in_an_urban_area_of_kolkata_india [Google Scholar]
- Saleem SM, Quansar R, Haq I, Khan SM. Imposing COVID-19 lockdown and reported dog bite cases: an experience from a tertiary antirabies center of North India. *J Vet Behav*. 2021;42:48-52. [PubMed] [Google Scholar]
- Punguyire DT, Osei-Tutu A, Aleser EV, Letsa T. Level and pattern of human rabies and dog bites in Techiman Municipality in the Middle Belt of Ghana: a six year retrospective records review. *Pan Afr Med J* [Internet]. 2017 [cited 2022 Apr 7];28:281. Available from: <https://www.panafrican-med-journal.com/content/article/28/281/full> [PubMed] [Google Scholar]
- Rudresh HB, Jagadeesh B, Rajgopal J. Profile of animal bite victims reporting to intradermal rabies vaccination centre at a tertiary care government hospital: 10 years experience. *Int J Community Med Public Health*. 2019 Mar 27;6(4):1545. [Google Scholar]
- Raynor B, Díaz EW, Shinnick J, Zegarra E, Monroy Y,

- Mena C, Puente-Leon MD, Levy MZ, Castillo-Neyra R. The impact of the COVID-19 pandemic on rabies reemergence in Latin America: the case of Arequipa, Peru. *PLoS Negl Trop Dis* [Internet]. 2021 May 21 [cited 2022 Apr 7];15(5):e0009414. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8174740/> [PubMed] [Google Scholar]
20. Sharma S, Agarwal A, Khan AM, Ingle GK. Prevalence of dog bites in rural and urban slums of Delhi: a community-based study. *Ann Med Health Sci Res* [Internet]. 2016 [cited 2022 May 2];6(2):115. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4866364/> [PubMed] [Google Scholar]
 21. Patel S, Toppo M, Lodha RS. An epidemiological study of animal bite cases in a tertiary care center of Bhopal city: a cross-sectional study. *Int J Med Sci Public Health* [Internet]. 2017 [cited 2022 May 2];6(3):539-43. Available from: https://www.researchgate.net/profile/Manju-Toppo/publication/309880487_An_epidemiological_study_of_animal_bite_cases_in_a_tertiary_care_center_of_Bhopal_city_A_cross-sectional_study/links/5b1e128ca6fdcca67b6918ef/An-epidemiological-study-of-animal-bite-cases-in-a-tertiary-care-center-of-Bhopal-city-A-cross-sectional-study.pdf [Google Scholar]
 22. Kapoor P, Baig VN, Kacker S, Sharma M, Sharma M. A cross-sectional study of knowledge regarding rabies among attendees of anti-rabies clinic of a teaching hospital, Jaipur. *J Family Med Prim Care* [Internet]. 2019 [cited 2022 May 2];8(1):194. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6396603/> [PubMed] [Google Scholar]
 23. Wadde SK, Edake SS, Dixit JV, Nagaonkar AS. Non-compliance of post exposure prophylaxis amongst dog bite cases attending antirabies clinic of a tertiary care hospital-a record based study. *Natl J Community Med* [Internet]. 2018 [cited 2022 May 2];9(9). Available from: <https://njcmindia.com/index.php/file/article/view/785> [Google Scholar]