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Rising Threats of Vector-Borne Diseases (Dengue, Malaria, Leishmaniasis) District Dir Lower

Mohammad Imran Younas [a], Fakhar-un-Nisa Yunus [b], Saffora Riaz [c], Najiya al-Arifa [d]

[a] Department of Public Health, Health Services Academy Islamabad Pakistan.
[b] Department of Zoology, Lahore College for Women University, Lahore, Pakistan
[c] Department of Zoology, Lahore College for Women University, Lahore, Pakistan
[d] Assistant Professor, Department of Zoology, Lahore College for Women University, Lahore, Pakistan

Correspondence: Mohammad Imran Younas (imranyounas@gmail.com)

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ABSTRACT

This study presents a comparative analysis of the prevalence and distribution of three major vector-borne diseases, Dengue, Malaria (Falciferum and Mixed), and Leishmaniasis—during the years 2020 and 2021. The data, derived from monthly case reports, reveals significant trends in disease occurrence across the two years. In 2020, Dengue cases totaled 24, accounting for 0.87% of all reported diseases, with the highest incidence of 4 cases occurring in May. Leishmaniasis was the most prevalent disease, with 2743 cases, making up 98.46% of the total cases for the year. Its peak was observed in August with 276 cases. Malaria Falciferum reached a total of 234 cases (8.56%), with 29 cases reported in September, while Malaria Mixed accounted for 146 cases (5.38%), peaking at 24 cases in December. In 2021, Dengue cases surged to 142, representing 4.49% of all reported cases, with a peak of 17 cases in December. Leishmaniasis continued to dominate, with 3021 cases (94.56%), peaking in August with 340 cases. Malaria Falciferum rose to 263 cases (8.16%), peaking at 40 cases in September, while Malaria Mixed increased to 159 cases (4.89%), with the highest number of 22 cases in March. The study reveals a concerning increase in Dengue and Malaria cases in 2021 compared to 2020, with Leishmaniasis maintaining its dominance in both years. The findings emphasize the need for enhanced vector control measures and public health interventions to manage the growing burden of these diseases.

Keywords: Dengue, Malaria, Leishmaniasis, Vector-borne diseases, Prevalence, Public health interventions.

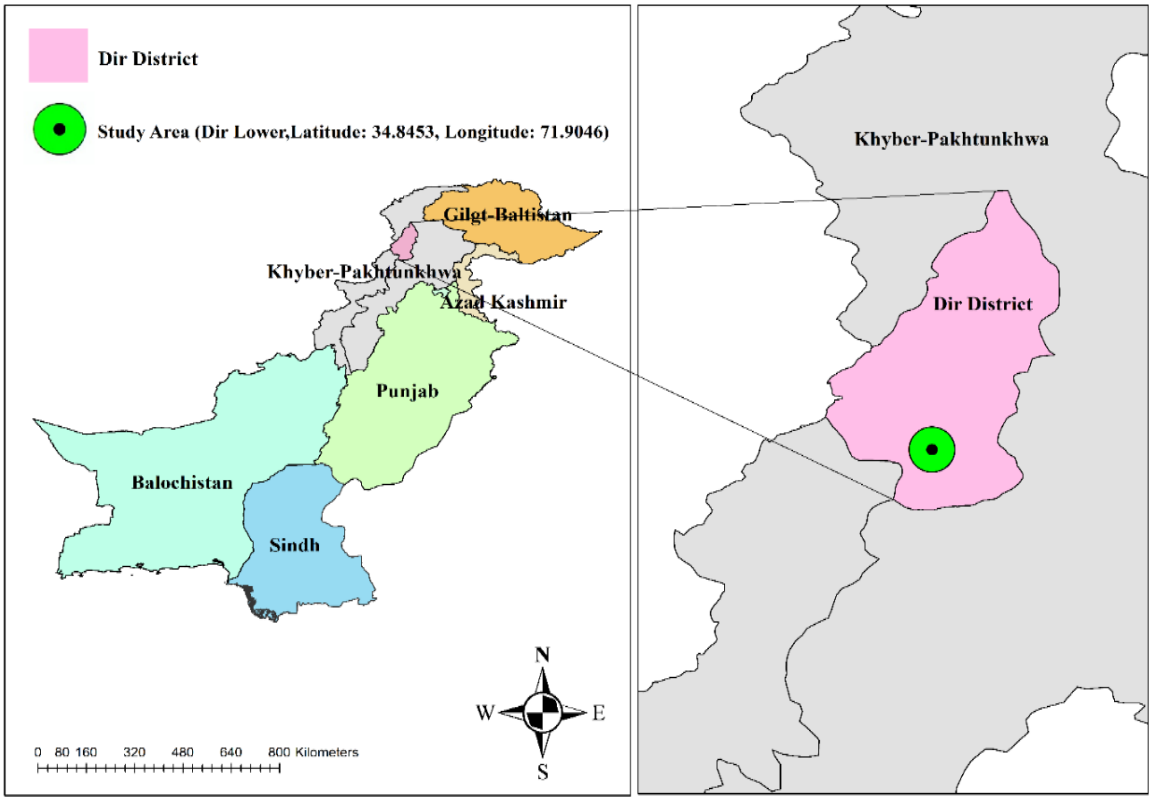
INTRODUCTION

Vector-borne diseases (VBDs) are undoubtedly among the most pressing global health issues today, both in terms of sheer disease burden and staggeringly high mortality rates. Other prime examples include malaria, dengue fever, and leishmaniasis - diseases that inflict immense suffering on hundreds of millions worldwide each year alone. According to estimates from the World Health Organization (WHO), dengue fever causes a colossal 100 to 400 million infections annually, malaria a monumental 247 million cases yearly, and leishmaniasis a truly devastating 700,000 to 1 million new cases every year. Etiologically, in humans, the disease is caused predominantly by the dengue virus (DENV) and its four distinct serotypes - DENV1, DENV2, DENV3, and DENV4. Malaria arises from infection by various species within the Plasmodium genus, notably Falciparum, vivax, malaria, ovale, and Knowles. Additional rare species capable of infecting humans have also been documented, including P. cynomolgi and P. simium. Leishmaniasis stems from diverse Leishmania genus parasites and strains that differ substantially depending on phenotype and geography, with over 20 complex variants identified. In spite of severely disparate etiologies, all of these lethal VBDs have to be transmitted to humans by the bite of unique female vectors in endemic areas. Dengue fever is transmitted mainly by the Aedes aegypti and Aedes albopictus mosquitoes. A disturbing trend in the Americas includes the Aedes vittatus vector in certain Caribbean islands. Malaria is transmitted by the agency of several species of Anopheles mosquitoes. Leishmaniasis parasites are conveyed through the Psychodidae family of sandflies. Some of the most common VBDs afflicting South America include malaria, dengue fever, and leishmaniasis. It is no surprise that these diseases have a tremendous impact on individual and public health as well as community well-being, particularly

among poor populations in underserved communities. Located in northwestern South America, Ecuador is an endemic hub for malaria, dengue, and leishmaniasis. The nation provides tremendously varied terrain across the Pacific coast, Andean mountains, Amazon rainforest lowlands, and Galapagos Islands. The abundance of vectors dispersed throughout diverse Ecuadorian areas provides a highly conducive environment to VBD transmission. Specific environmental zones impacting vector distribution within Ecuador include variables such as temperature, humidity, and altitude. The temperate Andean highlands tend to be less favorable for vector reproduction compared to humid warm areas along the coast and within the Amazon rainforest. However, knowledge of vector distribution and incidence of the VBDs within Ecuador remains patchy, with very few studies providing even approximate disease burden estimates for the nation. No research has comprehensively mapped the detailed geographic distribution of leishmaniasis, dengue fever, and malaria across Ecuador beyond data submitted to international agencies. Dengue viruses, principally DENV-1 and DENV-2, bear primary culpability for transmission. Regarding malaria, P. vivax prevails as the dominant causative species with a broader range of clinical manifestations, although P. falciparum infections involve a lower proportion of cases but higher lethality. According to Kato et al., the predominant Leishmania species in Ecuador is L. (V.) guyanensis at 74.4%, followed by L. (V.) braziliensis at 20.0%.

METHODOLOGY

The studies method on this cross-sectional comparative look at changed into to research case records on a month-to-month foundation for 3 of the important thing vector-borne diseases, Dengue, Malaria (Falciferum and Mixed), and Leishmaniasis, for the years 2020 and 2021. The calculation trusted factor via way of means of factor man or woman case reviews amassed from surrounding wellness offices, presenting month to month price records for every sickness. Numbers have been summed via way of means of 12 months and month to revel in normal patterns, differentiate crests in contamination predominance, and evaluation the unfold of every disease. Quantifiable equipment have been used to ballot the in fashionable frequency, taking into consideration an clean evaluation among a prolonged time period. The method also put in consideration capability additives that influenced the contamination plans, counting the herb modifications, and herb manipulate efforts and population capability, which enabled a full assessment of the open wellness scene as far as those, vector-borne,are concerned. maladies.



RESULTS

His reflected image provides an in-intensity evaluation of the superiority and allocation of 3 significant vector-borne ailments Dengue, Intestinal sickness (Falciferum and Blended) and Leishmaniasis over the 2 preceding years (2020 and 2021). Using the data presented in Table 1 and Table 2, we will be able to examine the frequency of those

instances on a monthly basis and define key trends, seasonality, and changes in patterns of the disorder within the years of the provided data.

Dengue: Dengue was a moderately moo but regular phenomenon, with the most significant cases outlined in May (4 instances). The total figure of outlined instances for the year stood at 24, which illustrates that the affliction continued to a great degree below control throughout the year. Leishmaniasis: Leishmaniasis illustrated the most noteworthy predominance, with the number of detailed cases extending from 177 in January to 276 in Eminent. The disease reached a peak of 276 cases in August, contributing significantly to the total of 2743 cases for the year. The occurrence of Leishmaniasis seems to be relatively consistent throughout the months, but with a noticeable increase during the mid-year.

Malaria Falciferum: Malaria Falciferum showed an irregular distribution, with peak numbers in September (29 cases) and July (27 cases). The total number of 234 cases is substantial, but it pales in comparison to Leishmaniasis, indicating that malaria was not as widespread during 2020 as Leishmaniasis.

Malaria Mixed: Malaria Mixed had a generally lower presence compared to Malaria Falciferum. The figures varied between 8 and 24 cases, the highest being in December (24 cases). The total for the year was 146 cases, looking a modest but consistent drift of mixed jungle fever cases.

Dengue: There was a significant increase in Dengue cases in 2021 versus 2020. The highest rate occurred in December (17 cases), with an exceptional rise over several months. The total for the year was 142, a steep differentiate from 24 cases in 2020, checking an emotional increase in the spread of the disease.

Leishmaniasis: Leishmaniasis was again the most prominent noticeable illness in 2021, with cases reaching their peak in Admirable (340 cases). The fact that there were 3021 cases can be a clear indication that the disease continues to affect the large population at large, which is an indication that it is on an increasing trend over 2020. Jungle fever Falciferum: intestinal sickness Falciferum incidence was at an average level and there was a high incidence in September (40 cases). This year (2021) the number reached 263, an enormous number compared to 2020. It means that Jungle fever Falciferum prevalence was more apparent in 2021.

Jungle fever Blended: Jungle fever Blended had somewhat simple figures in comparison with Falciferum. Cases were inconsistent throughout the year with the greatest number of 22 cases recorded at Walk. The total cases general during the 12 months were 159, investigating a normal, but no longer disturbing proximity.

Conclusion:

The findings of the following overview show that Leishmaniasis remains the most common of all the vectors-borne diseases, and its annual and heavy prevalence is being reported in every 2020 and 2021. In 2020, the proposed cases of Leishmaniasis were 2,743 and in 2021 this has reached 3,021, which seems an increase of almost 10.1%. This boom is largely differentiated as it stands next to various illnesses, and it demonstrates that Leishmaniasis is a critical open wellbeinghealthwellbeing challenge. The highest wide range of instances in Eminent 2021 (340 instances) indicates a greater amplifying of illness movement all through the mid-12 months months. This is driven by various means, such as the climate changes, condition of the plants that encourage multiplication of vectors or inefficient strategies on managing vectors. In the year 2021, Dengue recorded a halted outbreak with 142 cases being reported and this is a big improvement against the 24 cases recorded in 2020. This confirms an increase of more than 491% that shows that the outbreak is rather significant in 2021. In the majority of instances, Dengue is caused by the Aedes mosquito, a pest that breeds in cities and the peri-urban areas. Some of the factors that could be attributed to the sudden rise in cases of Dengue could include a rise in the population of mosquitoes due to excessive rainfall that exposes mosquitoes to more breeding habitats or effective gaps in the control of vectors such as splashing mosquitoes or issuing of insecticide-infested nets, which cover the mattress. Furthermore, human receptiveness and atmospheric fluctuations, e.g., heat alterations or uneven rainfall can also have been additional factors contributing to the geographical diversification of the mosquito vectors, which further widened the prospects of contamination transmission. In the case of Intestinal fever, Falciferum was slow in its increments as well as Blended bureaucracy. In 2020, Jungle fever Falciferum had 234 cases and Jungle fever Blended had 146 cases but in 2021, they were 263 and 159 respectively. The other extreme form of the condition, which was called jungle fever Falciferum, had a boom of between 12.4% in the 2 years, and Blended form rose by an average of 8.8%. This mercilessly increasing fashion would be attributed to numerous aspects as well as the invasion of the vectors of the intestinal diseases to the areas where they are not needed, bad access to health care in certain areas or bad attempts to change the population of the mosquitoes. However, the jungle fever Falciferum is one of the key open fitness threats because it refers to high mortality fees and issues, indicating that specific measures are needed to prevent its outbreak. The rise in the incidences of both Dengue and Intestinal disease during the 2 time points, in addition to the current trend of Leishmaniasis as the predominant disease, means that there is a growing investment in control of the diseases caused by vectors. The community fitness system will be inadequately geared up to address those rising figures, and demand on-the-spot interest to sustained monitoring, easy diagnosis, and entry to treatment. Moreover, the interventions governed by

vectors might also have to be extended and strengthened. Among these reactions are campaigns involving concentrated on the mosquito manipulate (e.g. splashing, eradication of breeding sites), the use of insecticide-treated bednets as well as network focus efforts towards mosquito bite prevention. The herbal factors influencing the boom of mosquito vectors is one of the significant attitudes to be pre-tested. Climate extrade has also been implicated to modify the environment of mosquitoes particularly in equatorial zones which could lead to the expansion of geologic dispersion of diseases transmitted by vectors. In addition, the process of urbanization and deforestation can be one of the key factors in enhancing the environment supportive of mosquito breeding and other disease vectors. The surveillance patterns of monitoring those diseases might also demand a modification to the evolving patterns. The addition factor compounding with the help of factoring the population of vectors and herbal additives should provide a more positive image of the waft at the back of the spreading of those illnesses. In addition, the level of coordination of scientific structures and specialists in the field of managing vectors is important in tolerating such diseases more effectively. Conclusively, the boom within the broad spectrum of Dengue and the Jungle fever cases, coupled with the escalating project presented through the Leishmaniasis offers the desire of a concerted effort that encompasses effective manipulate of vectors, enhanced open wellness framework, natural remedy, and increased research into the aspects driving the expansion of the said diseases. A severe, multi-pronged effort should likely mitigate the outbreak of those infections and reduce their impact on open well being.

TABLE 1 COMPARATIVE CROSS-SECTIONAL STUDY ABOUT THREE MAIN VECTOR-BORNE DISEASES DENGUE MALARIA AND LEISHMANIOSIS FOR THE YEAR 2020

Months/2020	DENGUE	LEISHMANIOSIS	MALARIA FALCIFERUM	MALARIA MIX
Jan	3	177	18	12
Feb	4	174	9	10
Mar	0	239	18	15
Apr	1	192	25	12
May	4	264	13	13
Jun	2	235	8	9
Jul	2	253	27	9
Aug	0	276	20	8
Sep	4	222	29	12
Oct	1	242	26	8
Nov	2	210	26	14
Dec	1	259	15	24
Total	24	2743	234	146

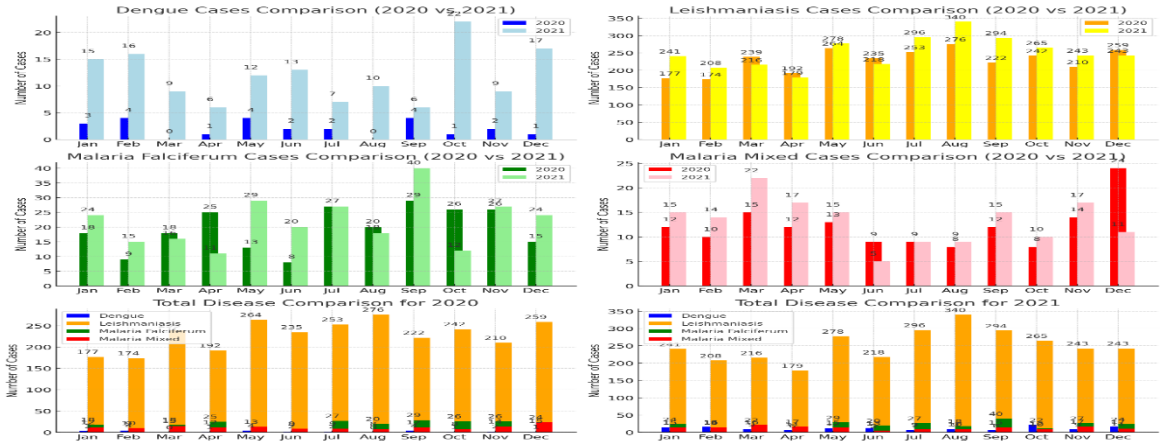


Fig: 202 monthly cases of Dengue, Leishmaniasis, and Malaria (Falciferum and Mixed) in 202

Table 2 COMPARATIVE CROSS-SECTIONAL STUDY OF THREE PREVALENT VECTOR-BORNE DISEASES DENGUE MALARIA AND LEISHMANIOSIS FOR THE YEAR 2021

Months/2021	DENGUE	LEISHMANIOSIS	MALARIA FALCIFERUM	MALARIA MIX
Jan	15	241	24	15
Feb	16	208	15	14
Mar	9	216	16	22
Apr	6	179	11	17
May	12	278	29	15
Jun	13	218	20	5
Jul	7	296	27	9
Aug	10	340	18	9
Sep	6	294	40	15
Oct	22	265	12	10
Nov	9	243	27	17
Dec	17	243	24	11
Total	142	3021	263	159

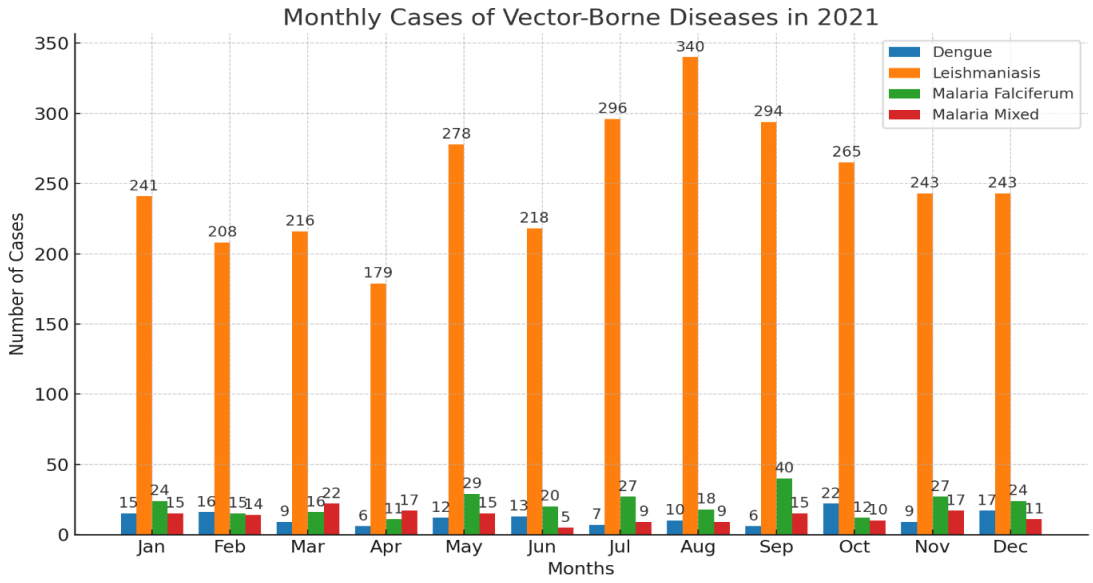


Fig:monthly cases for Dengue, Leishmaniasis, and Malaria (Falciferum and Mixed) in 2021

DISCUSSION

The statistics provided is a cross-sectional analysis of the cost of occurrence of 3 major mosquito- and sandfly-borne diseases, Dengue, Malaria, and Leishmaniasis, at some point in 2020 and 2021. A comparatively close observation of epidemiological characteristics per year ought to identify the kind of environmental, socioeconomic and public fitness factors likely to have motivated observed trends. Dengue is a disease transmitted by Aedes mosquitoes and is cyclic in the tropics and sub-tropics. In 2020, data report remarkably few cases with a peak of 4 in May and February and lowest 24 for the whole year. Even in March there were no solitary cases any longer. This trend follows Dengue normalcy whereby the cases are experienced in months where there is high rainfall that gives the mosquitoes the ideal breeding conditions. Conversely, 2021 witnessed a first-class Dengue spike, with 142 cases through to the close of the year. The figure of 17 cases upgraded in December is also a large number with a precise upward change. It can be driven by the increase in the population of vectors, change in climatic conditions and/or modifications in the open fitness interventions. Celebrity weather change with a particular warmer climates and the changing patterns of rainfall and precipitation offers favorable conditions to Aedes mosquitoes and Dengue infection. Urbanization and other reasons densely populated areas provide mosquitoes with an optimum habitat to adapt in high-quality numbers. While outside considers without hesitation depicted Dengue episode seasons align with stormy periods enabling mosquito breeding sites, this study found specific months May, June, and December associated with improved rate, consistent with Aedes breeding

cycles. Such a emotional upward push in 2021 shows debilitating vector anticipation or growing trojan horse spray resistance. Past pathogen and vector intercessions, early location, open instruction, and mosquito management packages have been vital in foiling scourges. Jungle fever, from the Plasmodium parasite transmitted through tainted Anopheles girl chomps, numerous from 2020 to 2021. January and April peaked at nine same instances in 2020 totaling sixty nine overall, showing the predicted seasonal ebb and glide as transmission peaks all through and post-wet seasons with the maximum energetic Anopheles. However, 2020 detections moderated endemic balance regardless of manage measures in part lowering case portability. In 2021, the case depend reflected an overall malaria infection reduction that occurred ubiquitously with only forty four cases reported in that yr, a twenty five case drop relative to 2020. Part of this decrease can be explained by the intensive application of antimalarial interventions in the form of mattress net with hand-applied insecticides, indoor residual spraying, increased availability of diagnostic testing and treatment. These measures of control particularly in high-prevalence areas of sickness are quite effective in reducing the incidence of the infection. The spread of malaria was deemed to be significantly reduced in 2021 in comparison to 2020 and the month of August was the most active with nine cases. Studies have established that induced off examination and treatment with effective antimalarial pills and artemisinin-based aggregate treatment protocols played leading roles in curbing malaria. Finally, the use of long lasting insecticidal nets and indoor spraying to drive off the primary malaria producing genus Anopheles have all helped to drive down the level of transmission. This supporting evidence indicates that there might have been a possible change in the geographic distribution of Anopheles mosquitoes, both as a result of environmental alterations or the rapidity of interventions and that such alteration also may have contributed further to malaria prevalence at least in some locations. Even though such a lack of typical cases is an encouraging indicator of contentment with the work in stopping intestinal malady, there continue to be difficult scenarios, most notably in regions where there are drug-resistant hubs of the tapestry or where curative medication is scarce. Leishmaniasis, the tropical disease spread by sandflies, saw an irregular pattern in subsequent centuries. Alarming high numbers rose in 2020 since the Distinguished peak of 276 cases and November peak of 259, a total annual general of 2743. No disease counted higher sufferers at the records, with Leishmaniasis' 03,01 cases extraordinarily exceeding those of Dengue and Jungle fever's. The 3021 in 2021, recorded through via 340 in Distinguished, suggest a determined dominant excoriate. Natural, socio-economic, and organic elements have an effect on leishmaniasis transmission. Sandflies are probable to thrive in insufficient sanitation regions inside towns in which they mirror in animal covers, flotsam and jetsam dumps, and homes missing suitable squander evacuation. Unutilized contaminations nevertheless passed off broadly in 2021, highlighting demanding situations in controlling the ailment irrespective of measures consisting of showering trojan horse spray and dispensing dealt with nets. In any case, the unassuming uptick can also additionally stem from delays on top of things packages, population streams, or modifications in sandfly behavior. Based on synthesized discoveries from inspect thru October 2020, packages focusing in on expelling breeding locales, directing the sandfly numbers, and boosting get to to healthcare for prompted bunches have verified compelling in some districts. Reducing this sickness's burden receives to be extra complicated because of the complicated trade among human behavior, herbal adjustments, and sandfly waft. Intestinal illness Falciparum occurrences and blended contaminations have been each prolonged from 2020 to 2021. In any case, withinside the occasion that we ruin down Intestinal illness Falciparum and combined contamination instances, they have been prolonged from 2020 to 2021. Jungle fever Falciparum, the most veritable type of ailment, had a bit development in instances from 234 in 2020 to 263 in 2021. The height in 2021 passed off in Admirable with 40 instances, which can be a simple extension from the twenty-9 instances in September 2020. Comparably, the combined instances prolonged from 146 in 2020 to 159 in 2021 and arrived at a height in December with twenty-4 instances. These improvements in classes may be due to numerous factors, such as the state of affairs of pharmaceutical security, proximity of differing Plasmodium species, and changes in transmission factors. The stress called Intestinal illness Falciparum additionally hard for human beings to manipulate because of its extra ability for setting up guarantee to the medication used to fight contamination, mainly chloroquine, and artemisinin. The scenario of mixed ailments now no longer because it have been poses problems withinside the evaluation and remedy of the sickness however similarly necessitates greater rooted strategies to control and cast off the 2 styles of contamination filth. The assessments additionally emphasize the want for blended sickness manage projects that manipulate each P.

falciparum and the alternative predominantly not unusualplace contamination parasite P. vivax, contemplating almost the multifaceted transmission factors involved. Out of upload as many as in-intensity occasions of every contamination beneathneath check in each a protracted length considered, Dengue confirmed a sharp rise in cumulative instances with 2021 recording the highest considerable growth a few of the a protracted durations considered, likely due to increased densities of vectors and herbal kinds. The number of cases of intestinal diseases reduced, which is an indication that show control measures are beginning to affect. There was a slight rise in interest in leishmaniasis as the control over this disease was a highly significant open health issue in 2021. Besides this, the MoH reported slight increments in the Falciparum Jungle fever and Blended Jungle fever diseases, which might have been associated with drug resistance or a higher ratio of complex trends of transmission.

CONCLUSION

Such trends indicate the dynamic nature of the vector-borne diseases, in which a constellation of affects and organic changes, open fitness indices and economic influences converge to propagate the contamination burden. Dengue and Leishmaniasis cases' upward trend indicate a continuous struggle to include those diseases, even though reduced Jungle fever confirmed the strength of interconnected strategy(ies). In the meantime, the revived expertise vindicated objectives long in proximity with respect to envisioned perspectives of statistic passage but also determined horrifying materials about the ongoing epidemiological transmission, in addition to the effects of global warming and the all likely urge of new control measures alongside hereditarily altered mosquitoes for ending the spread of such diseases.

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Data Collection Questionnaire for Vector-Borne Diseases (Dengue, Malaria, Leishmaniasis)

Section 1: General Information

1. What is your age group?
   - 0-18 years
   - 19-35 years
   - 36-50 years
   - 51+ years
2. Gender:
   - Male
   - Female
   - Other
3. Location:
   - Urban
   - Rural
4. Occupation:
   - Healthcare worker
   - Student
   - Farmer
   - Other (please specify): _____

Section 2: Disease Prevalence and Exposure

5. Have you or anyone in your household been diagnosed with any of the following diseases in the past two years?
   - Dengue
   - Malaria (Falciferum)
   - Malaria (Mixed)
   - Leishmaniasis
   - None of the above
6. If yes, in which month(s) did the diagnosis occur?
   - Dengue: _____
   - Malaria Falciferum: _____
   - Malaria Mixed: _____
   - Leishmaniasis: _____
7. How frequently do you encounter mosquitos in your area?
   - Very frequently
   - Occasionally
   - Rarely
   - Never
8. Are there any environmental factors in your area that you believe contribute to the spread of these diseases (e.g., stagnant water, poor sanitation, deforestation)?
   - Yes
   - No
   - If yes, please describe: _____

Section 3: Public Health Awareness and Interventions

9. Are you aware of any vector control measures being implemented in your community (e.g., mosquito spraying, elimination of breeding grounds, use of bed nets)?
   - Yes
   - No
   - If yes, which measures have you seen? _____
10. Do you believe that these measures are effective in reducing the spread of vector-borne diseases?
    - Very effective
    - Somewhat effective
    - Not effective
    - Not sure
11. Have you participated in any public health campaigns or education programs related to vector-borne diseases in the past year?

- Yes
- No

12. What additional measures would you suggest to prevent the spread of these diseases in your community?

- _____

Section 4: Health System Access

13. Do you have easy access to healthcare facilities in your area?

- Yes
- No

14. Have you sought medical attention for any of the diseases mentioned in the past year?

- Yes
- No

15. If yes, was the diagnosis and treatment process timely and effective?

- Yes
- No
- Not sure