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RESEARCH ARTICLE

CUTANEOUS LEISHMANIASIS INFECTION AMONG PATIENTS IN AL-MADINA AL-MUNAWARAH, KSA

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Abstract

Background: Cutaneous leishmaniasis (CL) is a major tropical infection of public health importance. It is caused by a group of protozoan intracellular parasites. Coinfected individuals with Leishmania-HIV have high risk of having a complete clinical illness and high recurrence rates and mortality. Antiretroviral therapy lowers disease onset, delays relapse, and boosts coinfected patients' survival. In Brazil, Ethiopia and the Bihar region in India, high Leishmania-HIV coinfections are recorded. CL is considered as a distinct public health hazard due to the catastrophic effects on the patient. With an estimated yearly average rate of 321,300 cases, in the Middle East and throughout central Asia, CL is endemic. Among the countries of this region, Saudi Arabia has reported an estimated incidence between 9600 and 15,800 cases per year as the fourth endemic focus on zoonotic CL in Afghanistan, Iran and Pakistan.

Objective: our present retrospective investigation aims to describe the epidemiology profile of CL in Madinah province.

Methods: Human data were collected from the dermatology service of AL-Meqat Hospital.

Results: A total of 203 cases of CL confirmed were examined. The seasonal distribution of the phlebotomine fly is followed by cutaneous leishmaniasis. Non-Saudi patients are reported to be more infected with CL (145) than Saudi individuals (58).

Conclusion: This study indicates that CL is endemic in Al-Madinah Almunawarah region. CL is a major health problem occur in variable clinical forms.

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Introduction:-

Cutaneous leishmaniasis is a serious public health tropical infection. It is produced in the order of kinetoplastida by a group of intracellular protozoan parasites. This disease occurs in more than 70 nations, with 90 percent in Afghanistan, Algeria, Brazil, Pakistan, Peru, Saudi Arabia and Syria. In 18 of 23 countries in the Middle East, the disease is endemic [1, 2]. In the past five years, there have been more than one million cases of dermal leishmaniasis globally [3].

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More than 19,000 instances of CL have been documented in Saudi Arabia during the past seven years. The many types of the Leishmania parasite as causal [2, 4-9] have been isolated and incriminated. In this study, we report on the present status of CL in Saudi Arabia, the diagnostic methods utilised, therapy and illness management in several health sectors. People get CL infection from the infected female fly by an infected phlebotomine. Promastigotes penetrate into human circulation and become macrophages and amastigotes. This metamorphosis is triggered by a change in the host and pH surrounding the host [10, 11]. A total of 483 confirmed cases of CL were studied by NajouaHaouas et al. (2015). A seasonal distribution of phlebotomine sand fly fauna is followed by cutaneous leishmaniasis. Patients from Saudi as well as non-Saudi were practically equal infected. The number of reported cases of CL in men was higher than that in females. [12]. Morsy and Shoura reported the first CL case in KSA in 1973 [13]. According to statistics reports from the Health Ministry for 2002-2014, Al Qaseem, Alageel et al. are among the top five cities with endemic CLs. The Science and Research Journal Arab, Vol. 2, issue (4): 2016, 5, 15 p. 18-26; Article no: Al Munavarra, Riya, Hassa and Aser Madinah Al Munavarrah. Our present retrospective study describes the incidence of CL in the city of Madinah and its provinces during a 2-year period and is based on the average reported incidence of CL in Madinah [14-19]. Madinah is the city with its provinces, which follows them on 6th spot (2015-2016) [25].

For the first time, Morsy and Shoura (1976), in the middle of the seventies of the past century, characterized CL in the Kingdom of Saud Arabia (KSA). Since then, KSA has contributed to CL's worldwide reported load. KSA has been one of the world's 10 Top 10 Endemic Countries and 90% of CL worldwide have been documented in 1996 in only six nations [21]. After Saudi Ministry of Health (MoH) launched the Leishmaniasis Control Program (LCP) in 1978, the number of CL cases reported decreased drastically.

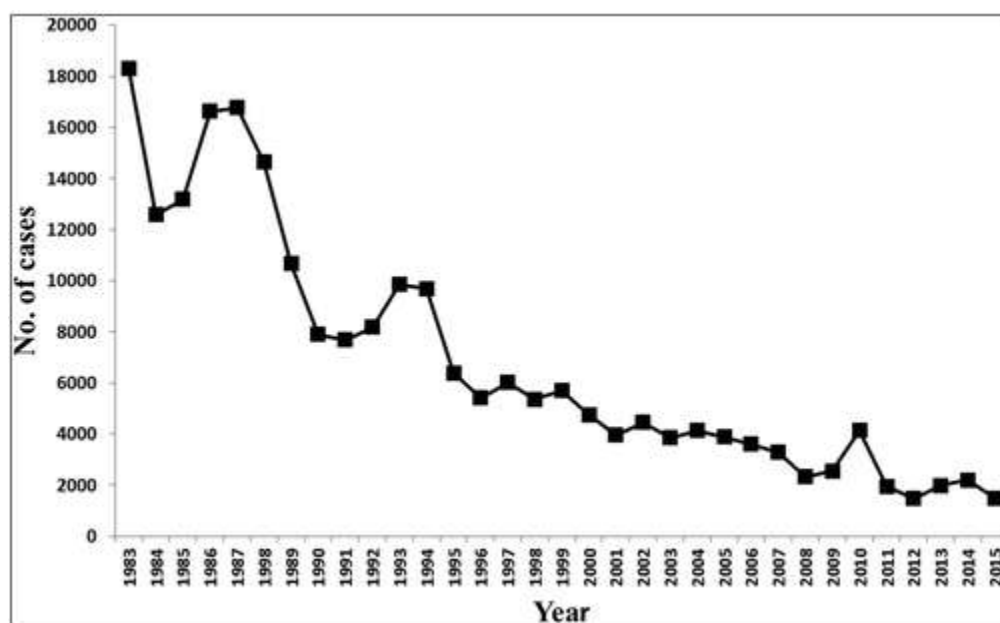


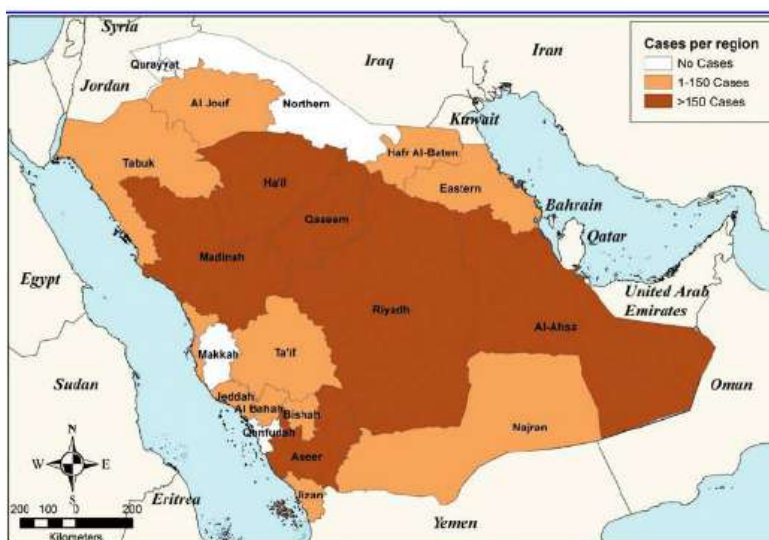
Figure 1A:- Diagram showing the significant decline of the CL cases reported over the previous 30 years in Saudi Arabia. CL, Leishmaniasis Cutaneous.

Epidemiology

In south-western Asia, KSA occupies an estimated 2,217,949 square kilometres, covering an area of 80 percent of the Arab Peninsula; with varied biological and climate trends. Several KSA variables have resulted in the development and continuity of CL. These include the rapid expansion and invasion of human reservoir habitat [24], the development of agricultural and irrigation systems and climatic change, and massive population movements, in particular the migration of non-immune populations to endemic areas, known as the increase in transmission (WHO 2016). Through its impact on the survival of the vector, the formation of parasite cycles, the migration of the host, and the exposure to both kinds of reservoirs, climate changes influence the spatio-temporal distribution. The recent rise in temperature and climate change have contributed to an increase in leishmaniasis overall. KSA is an open country with enormous population flows; every year, numerous job seekers worldwide go to KSA. Moreover, millions of Muslims go on pilgrimage to Umra and to see the sacred sites Makkah and Madinah each year and

throughout the year. CL reached pandemic levels in KSA historically in 1973. The KSA was later classified as a highly endemic country with CL, the disease began to be noticed and formal cases registered. The overall number of instances of new CLs in 1983 was 18,318. The control programme at the MoH level was developed. The efforts of the programme have dramatically declined the impact throughout the years following (Fig. 1) In KSA there are two types of leishmaniasis. Cases of visceral leishmaniasis (VL) are sometimes recorded in addition to CL. Over the past 10 years, occasional cases are often reported every year [23].

It is organised into 20 areas of health (and officially 13 areas); every region reports to the MoH on a regular basis (by monthly and yearly reports). The average number of instances during the last 10 years (2006–2015) ranges between 1,464 and 4,131. During this period the occurrences and distribution of reports were not significantly changed except for two regions: Makkah region, which was previously recorded as a free zone in 2015, and Al-Jouf, a free zone till 2013[25].



Literature Review:-

Leishmaniasis

Leishmaniasis is a transmitted vector disease by female flies Phlebotomine sand that is caused by Leishmania-like parasites. Leishmaniasis can be separated between two clinical forms: visceral and dermal. Visceral leishmaniasis is the deadliest kind, which causes 500,000 new cases every year, including 80,000 deaths (World Health Organization, 2010). 90% of VL is reported in Sudan, Brazil, India, Bangladesh and Nepal. The VL itself can be split in two basic forms: anthroponotic visceral leishmaniasis (AVL) requiring sandflies as a vector and human flow as a reservoir; (ZVL), which likewise needs sand as a vector but employs dogs or rats as a storage tank (although humans may also contract the disease).

The second kind, skin leishmaniasis (CL), leads to a much higher number of cases, however these instances tend to be less serious and self-healing. In just seven countries (albeit in very diverse geographies) 90 percent are reported in Saudi Arabia, Peru, Iran, Afghanistan, Brazil, Algeria and Syria, with between 1.5 and 2 million new cases of LC per year [27].

Leishmaniasis growth and worldwide expansion

In occasional situations, leishmaniasis has been discovered worldwide, where environmental conditions allow and favor its transmission. Recently, vectors and reservoirs of leishmaniasis have been a fresh focus worldwide. New leishmaniasis focus has, for example, been identified in the south and north of Mexico as one possible impact of global warming [28].

Leishmania was separated from people, dogs, rodents and flying sands. As a result of urbanization in suburban parts of Venezuela, various new focus has also been identified [29] Soil erosion was averted through tree planting in the

Kashan area north of the Isfahan region of Iran, however this generated new targets for the ZCL reservoir of *Rhombomyopimus*, leading in an outbreak with 8 to 15% of the population in the region [30].

Diagnostic tools for leishmaniasis

For the development of a CL programme, leishmaniasis diagnosis is vital. As already noted, active case identification is not practicable where accessible and easy-to-use diagnostic instruments in the field are not available. A variety of samples can, including skin biopsy (punch), skin scraping and skin aspiration, be taken in LC patients. The precise usage of the micro or molecular approach then depends on the correctness of the test. In comparison to microscopy and PCR the skin punch is more accurate than skin scraping. In addition, if the sample is adequately taken, skin aspiration could be superior than other modes of collection [31].

Leishmania Cutaneous (CL)

The cycle of cutaneous leishmaniasis is divided in two main kinds, including zoonotic skin leishmaniasis (ZCL) that requires a mammalian reservoir or another animal like the rat as a host, and is passed on to both old and new worlds by *Ph. papatasi*, *Ph. duboscqi* and many other sand fly. Another form and transmitted by *Ph. sergenti*, anthroponotic skin Leishmaniasis ACL also requires people to be a reservoir. However, in the absence of people, other mammals offer a possible reservoir [32].

Saudi Arabia distribution and management

The spread of cutaneous leishmaniasis in Saudi Arabia is extensive. In order to support the disease's spread, environmental and human variables play a highly crucial role. The CL cases have been documented in all Saudi regions. Over the last 17 years, almost 60,000 cases in Saudi regions have been reported with an average of 3,300 annually. CL instances interact substantially with weather, irrigation and urbanisation factors. As these regions grow huge urbanisation and irrigation, Al Qassim, Al Madinah, Al Ahsa, Hail & Asir are the most affected areas [33].

Control attempts for Saudi leishmaniasis have succeeded massively in the reduction of dermal leishmaniasis in the endemic areas. The programme was created in 1987 and expanded to cover Riyadh, Hail, Turkish Tabuk, Jazan, Najran, Taif and Al Bahaha in four zones – Al Ahsa, Asir, Al Madinah and Al Qassim.

The approach of the control programme is based on an annual plan for direct action to control leishmaniasis. Four points are covered in the annual plan. First, the endemic areas and locations with high intensities of active rodent burrows are actively and passively detected. Moreover, active rodents living in the vicinity of human settlements are being watched and their burrows eliminated. The intensity of sand flies is measured and the population of sand fly is then monitored.

The continued prevalence of leishmaniasis in Saudi Arabia involves several risk factors. Working routines involving sleep in remote sections of big farms or camping in the desert include social concerns. Illegal immigrants that cross the border every day are *L. tropique's* human reservoirs in the western and southwestern regions. In addition, 50% of the total volunteers in the current study are illegal immigrants, which underscores the significance of this factor. In addition, uncontrolled urbanisation in locations like as Al Ahsa and Al-Qassim impacts individuals in neighbouring and new settlements [34].

Key Variables of Risk

Socioeconomic terms

The risk of leishmaniasis is increased by poverty. Poor housing and household health (such garbage or open sewage) can improve breeding and rest areas, as well as their access to human beings. The sandflies are popular as a good supply of blood food. The houses are packed. Human behaviours, like outdoor or indoor sleep, can raise the danger [26]

Malnutrition The chance of an infection progressing to full blown conditions in diets without protein, iron, vitamin A and zinc.

Mobility of people

Cutaneous and visceral leishmaniasis epidemics are generally related with migration and non-immune movement into established areas with transmission cycles. Exposure to work and widespread deforestation continue to be key contributors [27].

Changes to the environment

Changes in urbanization and human invasions into forested areas can influence the occurrence of leishmaniasis [28].

Change in climate

The epidemiological effects of leishmaniasis can be climate-sensitive: Temperature, precipitation and humidity fluctuations can have a powerful impact on vectors and reservoir hosts by modifying their distribution and affecting their survival and population levels.

Significant temperature variations may have a profound impact on the *Leishmania* promastigotes development cycle in sandblasts, allowing parasite transmission in not previously disease-endemic areas; drought and hunger and flood can cause mass displacement and migration to *Leishmania*-transmitted areas and poor nutrition can jeopardize their immune systems [29].

Treatment and Diagnosis

Diagnoses are achieved by combining clinical symptoms and parasitological or serological investigations in visceral leishmaniasis (such as rapid diagnostic tests). The value of serological leishmaniasis in cutaneous and mucocutaneous tests is restricted and clinical manifestations are confirmed by parasitological tests. Leishmaniasis is treated according to numerous parameters such as the kind of disease, concurrent diseases, parasite species and geographical location [30].

Leishmaniasis is a treated and curable disease that requires an immunocompetent system as medications do not remove the parasite from the body and therefore, if immunosuppression happens, a risk of relapse. All diagnosed patients need to be treated promptly and completely for visceral leishmaniasis. The WHO Technical Report 949 "Leishmaniasis Control" has detailed information on the treatment of the different forms of the disease geographically.

Control and Prevention

Leishmaniasis prevention and control requires a variety of intervention measures because a complex biological system involves the host, parasite and sandfly vectors of human or animal reservoirs. The following are key preventative strategies [27]:

1. Early diagnoses and efficient timely therapy reduce illness prevalence and saves handicap and mortality. It helps decrease transmission and monitor disease propagation and burden. At now, anti-leishmania drugs are quite efficient and safe, especially for visceral leishmaniasis, even though they can be difficult to use.
2. Vector management helps minimize or discontinue disease transmission by lowering the sandfly quantity.
3. The pesticide spray, insecticide treatment netting use, environmental management and personal protection measures included in the control methods. In epidemics and conditions with high rates of fatality during treatment, efficient disease surveillance is vital for early monitoring and action.
4. The animal reservoir hosts control is complex and should be adjusted to local circumstances.
5. Social mobilization and partnership enhancement—Mobilization and community education must constantly be adapted on a local basis with efficient behavioural changes. Critical is the cooperation and partnership with numerous stakeholders and other programmes for vector-borne disease control [32].

Transmission

Leishmania parasites are passed on to infected female sandbags through bites that feed on blood to create eggs. Leishmaniasis epidemiology is dependent on parasite and sandfly species features, local ecological site transmission, present and prior human-species parasite exposure and the human comportment. Some 70 animal species, including humans, were discovered as *Leishmania*'s natural reservoir hosts [33].

Material and Methods: -

Population Study

Population refers to the sum total of people, things, events, etc., i.e. units of observation that are of interest to investigate and remain a subject. The group from which the result of the study can be extrapolated is this reference group or target group. After defining this target group, the researcher has to determine if all the individuals can be studied in order to get a result. Usually, not everyone can be included, so a sample is taken from the research community. An important feature of the sample is that each person must have an equal and non-zero probability of being included in the analysis.

It's one of Saudi Arabia's 20 provinces. This is in KSA's west. High summers and chilly winters (Average 35 °C high temperature) are mainly desert (average low temperature 15 Celsius). In Madinah there are 2,061,383 people [19].

2-Study design and data collection

Collection of data is the collection process and evaluating information in a defined systematic fashion on variables of interest, which helps one to answer specified research questions, test hypotheses, and analyze. The research aspect of data collection is popular in all fields of study, including physical and social sciences, humanities, industry, etc. Although methods differ by discipline, the focus remains the same on ensuring precise and truthful selection [35].

Data are based on AL-Meqat Hospital Dermatology Services available records from January to December 2016 and basic data are acquired for all patients, including numbers, ages, sex and nationalities (Saudi or Non-Saudi).

Results:-

A total of 203 verified CL cases were investigated. Following seasonal phlebotomine fly spread is dermal leishmaniasis. Patients from dermatological clinics participated at AL Meqat Hospital in Madinah, KSA, from January to December 2016. The majority of non-Saudi patients (145) appear to be infected with CL (58) versus Saudi individuals (59). The number of instances of CL reported was higher for males than for women. The incidence of CL was related to age in adolescents and adults.

Table 1:- Distribution of CL among Nationality.

Months	Saudi	Non-Saudi	Total
January	12	29	41
February	9	23	32
March	8	19	27
April	5	11	16
May	2	6	8
June	4	5	9
July	0	8	8
August	3	7	10
September	3	6	9
October	4	7	11
November	3	11	14
December	5	13	18
Total	58	145	203

Figure 3:- Distribution of CL among Nationality.

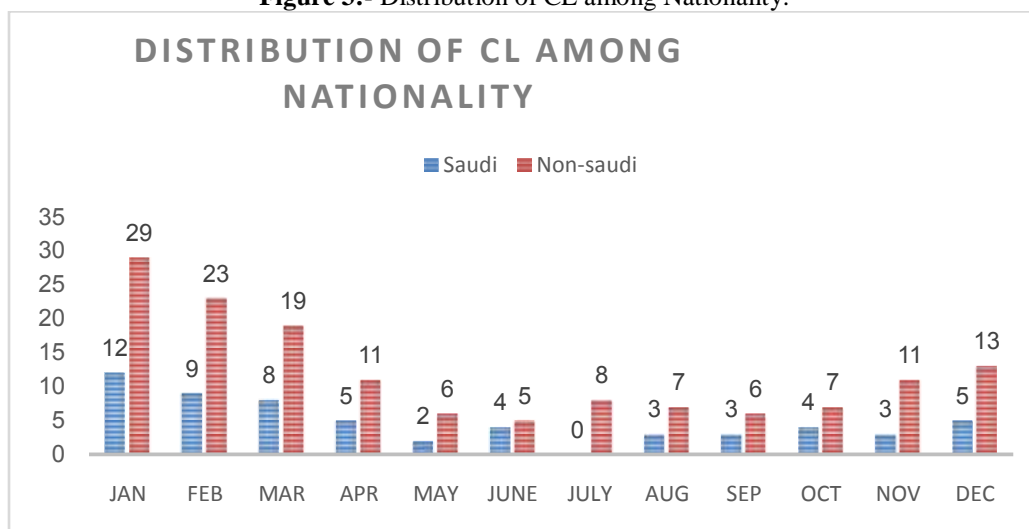
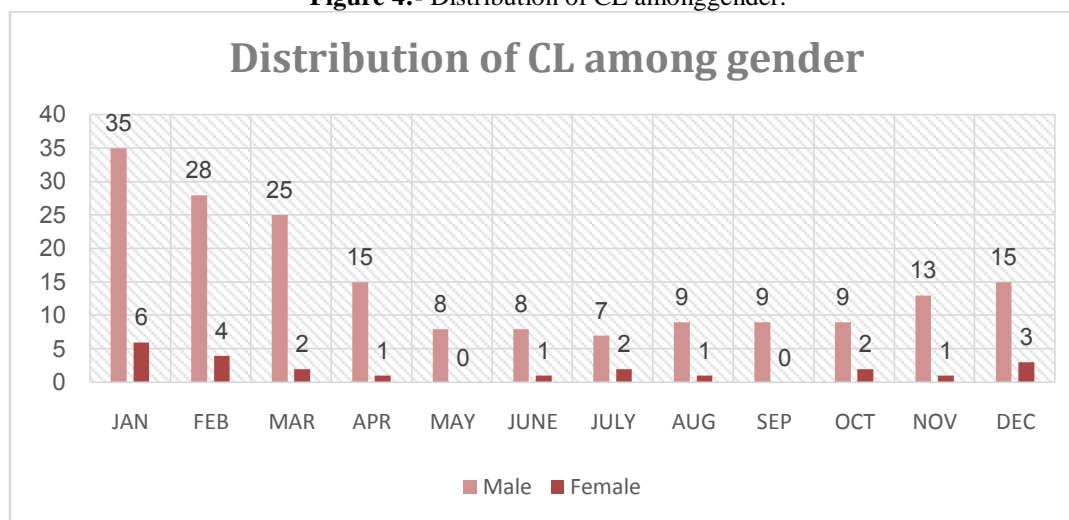


Table 2:- Distribution of CL amonggender.

Month	Male	Female	Total
JAN	35	6	41
FEB	28	4	32
MARCH	25	2	27
APR	15	1	16
MAY	8	0	8
JUNE	8	1	9
JULY	7	2	9
AUG	9	1	10
SEP	9	0	9
OCT	9	2	11
NOV	13	1	14
DEC	15	3	18
Total	180	23	203

Figure 4:- Distribution of CL amonggender.**Figure 5:-** Showing Cutaneous leishmaniasis.

Parasite Morphology

Amastigotes are small spherical cells with an unflagellated diameter of 2-4 μm and are surrounded by a vacuolated cytoplasm. Cinetoplasmic cells are the same.

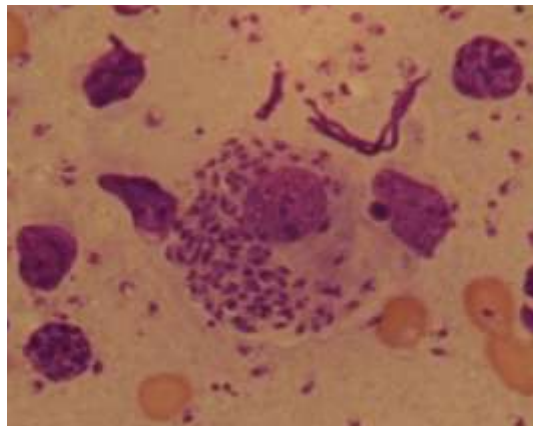


Figure 6:- Amastigotes.

Discussion:-

Cutaneous leishmaniasis has been reported in the Arabian Peninsula since 1973. A large set of data is available concerning the epidemiological feature of this disease in some foci of the country such as Hail, Al Baha, Al Hassa and Al Qassim provinces. These data concern the identification of the causative *Leishmania* species, the clinical feature as well as the analysis of the phlebotomine sand fly's fauna in these regions [4,5,7,]. Despite all these studies, some Saudi foci are still not investigated and no reports about the epidemiological feature of CL are available until now. Among these foci is the Madinah Province in western Saudi Arabia.

CL in Both Male and Female we Have Noticed

Teenager and adult men are significantly more infected than women. This result could be explained by the difference in the sartorial habits between the two genders. Indeed, the total veiling of teenager and adult women in Madinah province results in a decrease of the risk of sand fly biting and therefore a decrease of the CL prevalence in this gender. This last finding was already reported by Al-Tawfiq and Abukhamsin and Al-Gindanetal [14,20].

CL Concerning the Nationality of the Patients

Both Saudi and non-Saudi are affected with CL and appear to be predominant among the non-saudi patients (145) more than Saudi patients (58). It is important to highlight that 95.8% of the non-Saudi patients are teenagers and adults (more than 15 years old). This must be the direct consequence of the composition of this population since foreign workers are mainly composed by adults. According to Jaber et al, 2013, the enhancing of a national reporting system through the incorporation of data that are geocoded based on patients addresses and using Geographic Information Systems-based multiuser geodatabases could be the appropriate way to overcome this under-estimation limit [17]. This study outlines the importance of Cutaneous Leishmaniasis in epidemiology of the diseases in AL-Madinah 2016.

Leishmaniasis of the Cutaneous in Hail is endemic. The report (2006–2012) reports of approximately 183 CL cases in the region are reported annually in the Ministry of Health of the Kingdom of Saudi Arabia. This disease is infrequently investigated in the Hail region in spite of its endemic condition. In 2014, a single retrospective study highlights the spread of this disease in several sections of Hail. The causative species of this disease or the vector cannot be found in any data [36].

As far as we know, *Leishmania* species is the first time identified in this field of inquiry. *L. major* was responsible for all positive instances of human CL which indicated the presence in this field of investigation of an even focus of zoonotic cutaneous leishmaniasis (ZCL). However, the existence of few microfoci anthroponotic CL (ACL) in Hail region could not invalidate the absence of human CL cases caused by *L.* [37].

Important changes in leishmaniasis epidemiology have been seen in recent years. Leishmaniasis has developed in urban environments in addition to rural areas. Typically, VL affects adults more likely to have vectors of sand fly. This classical image has evolved, and newborns and young children have experienced a more prevalent sickness. 34 In Saudi Arabia VL is observed in smaller age groups. That seems to be the case. Leishmania exposure may indeed cause protective immunity to develop. The increased prevalence of VL in children and children could be due to this. Due to the nature of their profession, VL is more common among males than women [39].

Women have a particular predicament in Saudi Arabia. Often they stay indoors or cover their body outside, which results in lower exposure to leishmania and hence reduced susceptibility.

The overlap of VL and other disease areas like malaria, typhoid, TB and HIV may present challenges to VL diagnosis. The VL can be associated with certain disorders. In places which were previously free of disease, population migration and increasing travelling contributed to the emergence of VL. The patients can have aberrant clinical appearance in certain cases and stay unnoticed. A case with a 42-year-old patient in al-Khobar (Eastern province), a recognised non-endemic VL region, has been described recently by Alwazze and Alhashimalsayed. 4 This patient came from Gizan, however owing to odd clinical presentation VL was not considered at the first checkup [38].

Recommendation:-

1. Many neglected tropical diseases (NTD's) that are transmitted by vectors are currently at high levels of endemicity of these diseases, and their approaches to diseases like dengue, leishmaniasis (skin, visceral) and alkhumra hemorrhoidal fever remain unintegrated by key governmental sectors. This situation remains despite the fact that the Ministry of Health, Municipalities and Agriculture has provided an unrestricted funding for the control of these diseases.
2. The present structures and tactics for controlling and treating these diseases urgently need to be reassessed. Every year the KSA welcomes 12 million visitors, 2,5 million of whom are Muslim Haja pilgrims. Despite intense health efforts over several decades, the role of reservoir hosts in cutaneous leishmania (CL) has been challenging in removal (Ministry of Health report, 2014). The dengue hemorrhagic fever incidence is linked with low incomes and the socio-economic elements involved.
3. The Kingdom of Saudi Arabia should work on increasing spending on health and on increasing spending to conduct training courses on the importance of staying away from the causes of this disease in particular.
4. Awareness of the symptoms of the disease.
5. An increase in spending on conducting medical conferences on the disease and its symptoms and causes.
6. The international community has come together on the importance of addressing this issue.

Conclusion:-

A total of 203 confirmed CL cases were investigated. Cutaneous leishmaniasis follows a seasonal distribution related to the activity of the phlebotomine sand fly. The patients attended to Dermatology clinics at AL-Meqat Hospital in Madinah, KSA. The infected cases of CL appear to be predominant among the non-saudi patients (145) more than Saudi patients (58).

A genuine requirement is to establish a national protocol to combat NDBDs covering such things as setting up endemic disease centers to coordinate strategies for controls, identify the research priorities and develop the protocol for insecticide use, finance diagnostic laboratories and research laboratories, develop a case reporting system and provide unit-based financial support.

KSA is endemic to CL; additional effort and integrated approaches to the fight against this illness are required. It is recommended to address the potential risk factors in order to prevent invasion of natural habitats and, if necessary, implement certain checks to urbanisation and construction of new buildings with certain ecological and biological assessments. In order to prevent several vector-borne illnesses including CL, however, vector control actions and health education on the use of personal protection measures are to be performed routinely during Hajj pilgrimage.

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