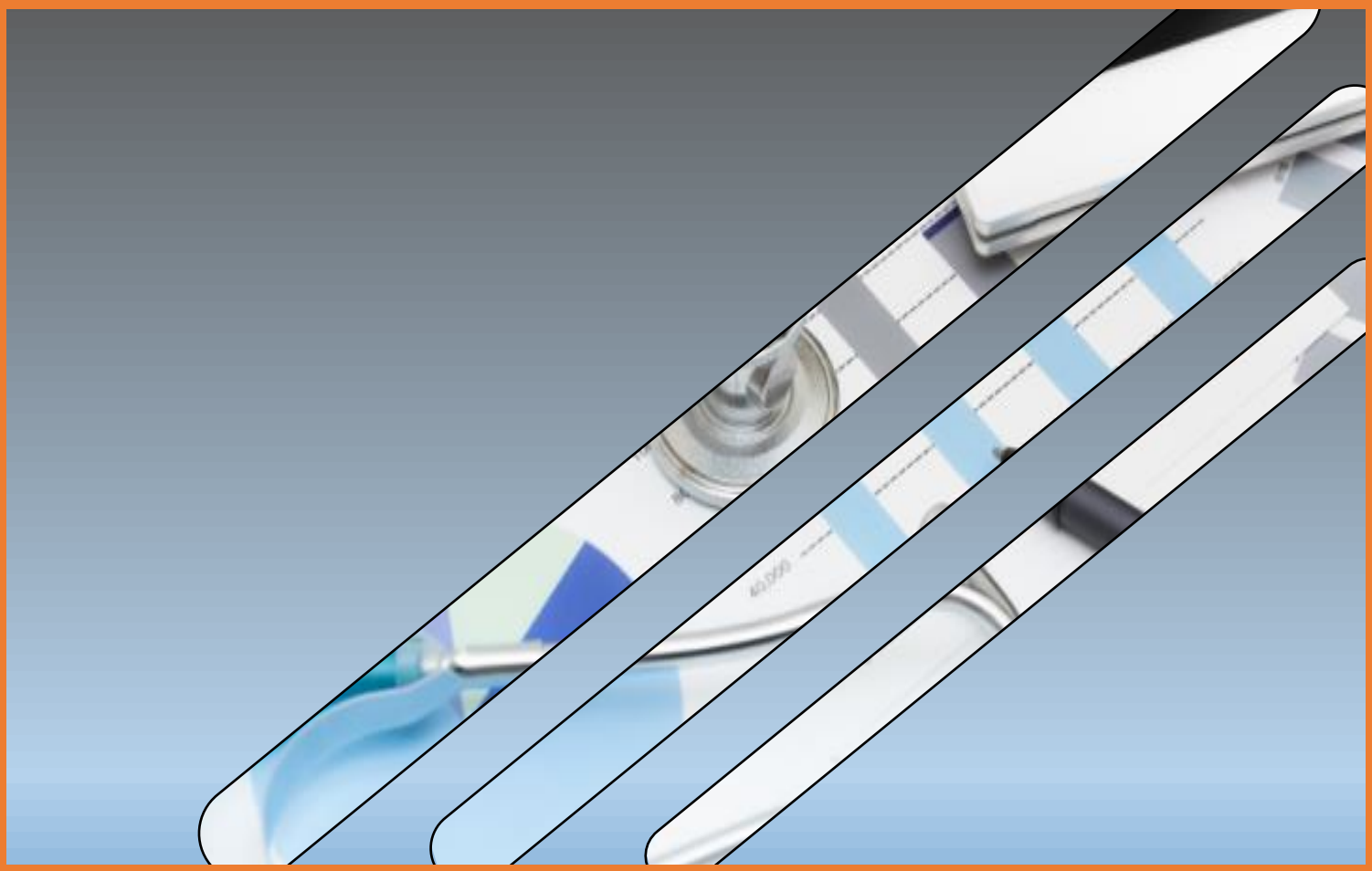

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GUEST COMMENT

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National Dengue Day (India): Combatting the Vector-Borne Public Health Threat

Dr. Mandeep Singh

Dengue is a mosquito-borne viral infection causing a severe flu-like illness and sometimes causing a potentially lethal complication called severe dengue.[1] It is caused by the dengue virus (DENV, 1–4 serotypes) and transmitted by bite of infected Aedes aegypti mosquito which bites during daylight hours. National Dengue Day is observed in India on May 16 every year with the recommendation of Ministry of Health and Family Welfare, Government of India to create awareness about dengue; and to intensify preventive measures and preparedness for the control of disease in the country before transmission season starts.[2]

A dramatic rise has been seen in the global incidence of dengue in recent decades. It is a life-threatening infection and results in many deaths each year. About half of the world's population is now at risk. There are an estimated 100-400 million infections each year.[3] The first epidemic of clinical dengue-like illness was recorded in Madras in 1780 and the first virologically proved epidemic of dengue fever in India occurred in Calcutta and Eastern Coast of India in 1963-1964.[4-6]

As per the National Vector Borne Disease Control Programme (NVBDCP), Ministry of Health & Family Welfare, Government of India, 136422 cases and 132 deaths were reported in India in 2019.[7]

Aedes aegypti mosquito, also known as the yellow fever mosquito, is responsible for spreading dengue fever, yellow fever viruses, Zika fever, chikungunya and Mayaro.[8] These mosquitoes are found worldwide (except in Antarctica) and can live in a large and eclectic array of ecosystems, from tropical forests to urban areas and tundra.[9]

After an infective bite, the subject develops symptoms in 3-14 days which generally a high fever, headache, muscle pain, bone and joint pain, nausea, vomiting, pain in eyes, rashes and swollen glands. Severe dengue or dengue hemorrhagic fever is a life-threatening condition with severe abdominal pain, persistent vomiting, bleeding gums, bleeding nose, hematuria, hematemesis, melena, bleeding under the skin, difficulty in breathing, fatigue, restlessness and cold-clammy skin. A small proportion of cases may show fatal disease as dengue shock syndrome. Infected patients become a source of infection and can transmit the same to other via Aedes mosquitoes during 4-5 days after onset of symptoms.

Children are also too prone as they have a growing immune system and are not able to fight the disease effectively. Dengue fever not only affects liver and leads to a reduction in platelet count but also affects kidney, lung, heart and central nervous system. Very low levels of platelets can result in internal bleeding and shock, which leads to death from multi-organ failure.

Virological and serological tests can be used for diagnosis of dengue infection. The virological tests directly detect elements of the virus and serological tests detect human-derived immune components that are produced in response to the virus. Patient samples collected during the first week of illness should be tested by both serological and virological methods (RT-PCR). IgM and IgG tests detect dengue in the initial stages of infection, but since they throw up false positive and false negative results, a confirmatory test is needed. A positive IgG but a low or negative IgM indicates past dengue infection. The NS1 Elisa-based antigen confirmatory test is done three days after symptoms appear.

No specific antiviral medication for dengue exists. Appropriate and timely clinical diagnosis by physician followed by proper clinical management helps in reducing the fatality rate. Use of analgesics (paracetamol), taking plenty of fluids and rest are important aspects of treatment. Precautions should be stressed upon and mild dengue might turn into a fatal condition. The common precautionary measures

include covering water containers with lids, use of larvicidal agents in water storage tanks, use of insecticidal sprays in home and surroundings, covering arms and legs during transmission season, using mosquito nets, insecticide treated bed nets, mosquito repellent sprays, creams, lotions, coils and vaporizers to prevent mosquito bites, protecting dengue patient from further mosquito bites to prevent further spread of dengue to other subjects and preventing unnecessary stagnation of water.

The prevention and control of dengue depends on effective vector control measures. Use of acetylsalicylic acid, non-steroidal anti-inflammatory drugs and other drugs with effect on blood platelets and clotting factors is not recommended. Prophylactic platelet transfusions are given in dengue fever with thrombocytopenia to prevent hemorrhagic complications. Although the use of prophylactic platelet transfusions is increasing in countries where dengue is endemic, it is associated with risks and has financial implications.[10]

Dengvaxia, a vaccine to prevent dengue, manufactured by Sanofi Pasteur, is approved and registered in severala countries for specific age group and is recommended only to be given to persons with confirmed prior dengue virus infection. In 2017, the manufacturer announced that the people who receive the vaccine and have not been previously infected with a dengue virus may be at risk of developing severe dengue if they get dengue after being vaccinated.[11]

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REVIEW

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Antiepileptics and Sound Perception Disorders

ASHWANI BHASKER

ABSTRACT

Epilepsy, a neurological health issue has been reported in all age groups and all countries. Anti-epileptic drugs have been reported to have many adverse events affecting different body parts and organs but their hazardous affect on a primary sensory organ is less known. In this mini review, we discuss thee impact of anti-epileptic medications on sound perception which adversely disrupts the quality of life.

KEYWORDS: Epilepsy, Sound, Perception

INTRODUCTION

Epilepsy is a neurological disorder affecting approximately 1% of the world's population.[1] Epileptic seizures result in a set of brutal, unpredictable, and transient clinical manifestations resulting from the paroxysmal hyperactivity of a hyperexcitable neural network and its possible spread. Epilepsy treatment is based primarily on pharmacological treatment to reduce or even suppress the frequency of seizures and the pharmacodynamics of antiepileptic drugs vary according to the molecules, inducing one or more of these mechanisms: a strengthening of synaptic inhibition, a decrease in synaptic arousal, or even stabilization of cell membranes.

Because of their specific mechanism of action, antiepileptic drugs have indications in the treatment of one or more forms of epilepsy. Carbamazepine, sodium valproate, lamotrigine, levetiracetam can be used in several indications, such as generalized seizures tonic clonic seizures, absence seizures, myoclonia or partial seizures. Apart from epilepsy, certain molecules are also indicated in the treatment of bipolar syndromes, neuropathic pain, or certain facial neuralgia.

From a safety perspective, antiepileptics have a pattern of adverse events that vary from molecule to molecule, which may lead the clinician to reassess the patient's individual benefit/risk ratio. Among the most well-known examples, particularly due to their severity, are Stevens-Johnson syndromes due to lamotrigine[2], hyponatremias with carbamazepine and oxcarbazepine[3], gingival hypertrophies under phenytoin[4] or fetal malformations following sodium valproate.[5] In addition, pharmacological therapeutic follow-up may be performed at the individual level due to a narrow therapeutic margin and/or the risk of drug interactions for certain molecules.[6-8]

Because of their diffusion to the central nervous system, antiepileptic drugs expose patients to neurological adverse effects. Cognitive disorders under phenobarbital and aggressive states under lacosamide, felbamate, lamotrigine or levetiracetam are fairly well described examples, especially in the paediatric population.[9] Hamed SA in a review reported that long-term use of certain antiepileptic drugs was associated with the rare occurrence of tinnitus, hearing loss, or dizziness, including therapeutic doses. Although mostly reversible, these audio-vestibular abnormalities may persist despite discontinuation of treatment.[10] These hearing disorders appear to be less present in the collective consciousness of health professionals, potentially explained by the rarity of these adverse effects and non-serious symptomatology.

In the literature, the majority of hearing disorders in the perception of antiepileptic sounds concern carbamazepine. Tateno et al. published a case series of six cases of change in tone perception under carbamazepine and identified a few previously published cases.[13] The time frames for appearance, when specified, ranged from a few hours to two weeks after the introduction of CBZ. For all reported cases, the patients were all musicians, often possessing the absolute ear,

and probably more likely to notice moderate variations in tone perception than other patients treated with CBZ. The dosages used ranged from 100 to 600mg/day. Three-quarters were treated for epilepsy (with no particular profile reported), the rest for psychiatric disorders or neuropathic pain.[11] In the majority of patients, the adverse reaction rapidly regressed to the discontinuation of the offending drug or the decrease in dosage. Some patients, however, appeared to see a spontaneous improvement in symptoms despite continued treatment at the same dose.

Another case of hearing impairment in an epileptic subject has been reported with anti-epileptic drugs as causative agents.[12] whose symptoms disappeared despite the continuation of treatment at the same dosage. A genetic predisposition can be evoked but so far none of the authors who reported the cases have discussed this point.

Till date, carbamazepine, oxcarbazepine and lacosamide have been reported in the literature to be associated with the occurrence of sound perception disorders. Their mechanism of action could be the common feature of this pathophysiology, exceeding the hypothesis of a structural-toxicity relationship, since these are different. The mechanisms involved in the occurrence of these tonal perception anomalies are not elucidated for any of these molecules. However, several hypotheses have been raised, such as the possibility of a direct effect on the central nervous system. Indeed, interference with the sodium channels would alter the action potential of the auditory nerves and cochlear nuclei of the brainstem [10]. Furthermore, hypotheses of local action on the auditory system, with modification of the mechanical properties of the hair cells of Corti's organ, or an action on the sarcolemma of the ear muscle, affecting the tension of the tympanic membrane.[11–14]

Changing the perception of sounds is a very rare adverse effect of carbamazepine, oxcarbazepine and lacosamide, identified in the literature. Rapid onset after the introduction of treatment, a complete resolution of symptoms, in most cases at the end of treatment, is observed, without any after-effects appear to be reported. Because of the impact on quality of life due to impairment of a basic sensory organ, knowledge of this adverse effect seems important to evoke this diagnosis.

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CASE REPORT

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Foreign Body Management in The Maxillary Central Incisor of a Teenage Girl: A Case Report

RASHMI PUNDIR[1], CHETNA JAISWAL[*2]

ABSTRACT

Finding a foreign body lodged in the tooth structure of a tooth is quite uncommon occurrence and requires skill to remove the same. Its extraction requires a detailed case history followed by clinical, and radiographic examination to ascertain the size, position, and nature of the embedded objects so that the difficulty involved in its retrieval can be assessed. At times due to fear, a child hesitates from informing the parent regarding the lodgement and may only do so when one experiences pain. There is a great possibility that the foreign objects may act as a potential source of infection and lead to undesirable consequences. This case report will discuss the lodgement, retrieval and management of foreign object (tip of lead pencil) in the maxillary left central incisor of female teenager aged 16 years.

KEYWORDS: Foreign Body, Tooth Fracture, Tooth Mobility

INTRODUCTION

The discovery of a foreign object inside a child's tooth is relatively uncommon as well a troublesome incident in the field of endodontic therapy.[1] Such findings are said to be accidental in nature and can be attributed to the frequent habit of placing various objects in their mouth. There is a greater chance of a foreign body embedment in the case of an open pulp chamber due to a carious exposure of traumatic injury.[2]

These objects can remain unnoticed until these children present to the dentist with a complaint of pain, infection with or with our associated swelling. Its diagnosis can be done clinically if it is visible with the help of diagnostic tools, or with the help of dental x-rays.[3]

Various foreign objects in the form of paper clips, nails, sewing needles, incense sticks, metal screws, beads, pencil leads and stapler pins etc. embedded in the tooth of the child have been reported.[4] At times, these objects tend to fracture inside the tooth during exploration by the child or parents. And can lead to further complications.[2]

Its retrieval possesses a clinical challenge for the dentist, and several techniques can be used for its retrieval.[2] With proper care, these treated teeth can last for a lifetime. The present care report depicts a 16 year of female teenager with an embedded pencil lead in her maxillary left central incisor.

CASE REPORT

A 16 year old teenage girl reported to our clinic with the chief complaint of pain and black spot in her upper front right tooth since one week. Clinical examination revealed an Ellis class III fracture having grade I mobility in maxillary left central incisor [Figure 1 (a)]. The palatal aspect revealed a blackish spot inside the pulp chamber [Figure 1 (b)].

Her mother revealed that her tooth suffered trauma one year ago and a dental practitioner was consulted who initiated a Root Canal Treatment (RCT) in the affected tooth. However, as the pain subsided, the girl and her parents did not go for follow up treatment until the present consultation.

The affected tooth was not completely symptomatic and when it used to pain, the girl used to insert a some foreign object in her tooth to ease the pain and could not recollect what probably could have stuck in her open pulp chamber. Upon clinical examination, it did look like the tip of the lead pencil.

Radiographic examination revealed a large periapical lesion with an open apex and the appearance of a foreign body lodgement in the root canal system with a radio-opaque foreign object (lead pencil) (Figure 2). It was decided to retrieve the lead pencil by nonsurgical technique, and thereafter, complete the routine endodontic treatment with the mixture of calcium

Figure 1 (a): Pre-operative View
Figure 1 (b): Palatal view showing the embedded foreign object

hydroxide and propylene glycol to reduce the size of lesion in follow up (Figure 3).

Figure 2. Radiographic examination of the affected tooth revealed a large periapical lesion with an open apex and the appearance of a foreign body (lead pencil).

DISCUSSION

The presence of a foreign objects in the pulp chamber of a cavitated and/or traumatized tooth can be a result of the patient trying to relieve the underlying discomfort already present in the tooth as seen in the present case.[5] Such an occurrence could also be seen due to the a lack of awareness among the child and the parents/caregivers. Another fact could be due to the fear of the dentist or paucity of time and the child looks for a technique to "quickly relieve" one's pain.

To detect the lodgement of such foreign objects, clinical examination followed by a radiographic analysis to determine the extent and size of the foreign object is of diagnostic significance, and even more so when the foreign body is radiopaque.[6] The radiographic methods to localize a radiopaque foreign object are parallax views, vertex occlusal views, triangulation techniques, stereo radiography and tomography.[7]

Figure 3. Post-Operative Restoration

The appearance and/or ability to detect various materials on radiographs depends on the ability of the operator to visualise the foreign body depending on their inherent radiodensity and proximity to the surrounding structures.[8] Metallic objects except those made from aluminium radiopaque and are easily visible on the radiograph.

Removal of the foreign object is a complex procedure. As per McCullock, access to the foreign object is improved by removal of small amount of tooth structure.[9] Also, if the foreign object is snugly bound in the canal, the object may have to be loosened first; it should then be removed with minimal damage to internal tooth structure to prevent perforation of the root.[10]

The various complications that can arise if these foreign objects are not removed as they as serve as a foci of infection if not extracted at the right time. Authors have reported actinomycosis following placement of piece of jewellery chain into a maxillary central incisor11, as well

as chronic maxillary sinusitis of dental origin has been reported due to pushing of foreign bodies into maxillary sinus through the root canals.[12]

CONCLUSION

The lodgement of a foreign object in the tooth structure of a tooth is quite a rare occurrence but can escalate if proper attention is not paid to the affected tooth. Children and parents must be educated regarding the same during their dental visits to the paediatric dentist and report such a occurrence as soon as possible so that proper dental care can be rendered and any complication can be avoided.

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CASE REPORT

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Benign Mucous Membrane Pemphigoid: A Case Report

NIDHI OJHA[1], OM PRAKASH YADAV*[2]

ABSTRACT

Benign Mucous Membrane Pemphigoid (MMP) is a vesiculobullous (VB) lesion that affects oral and nasal mucosa, oropharynx, conjunctiva, and genital mucosa. It is considered an autoimmune disease. Autoantibodies are produced due to several external factors or genetic factors. It creates many complications, such as defects in vision, voice alteration (hoarseness), airway obstruction, and dyspareunia. The subepithelial blisters form due to these antibodies. Treatment modalities differ from topical steroids to systemic steroid therapy based on the nature and severity of clinical symptoms.

KEYWORDS: Autoimmune Disease, Pemphigoid, Mucous Membrane

INTRODUCTION

Vesiculobullous (VB) diseases are a group of oral disorders denoted by the development of vesicles or bullae. VB group of diseases comprise of mucocutaneous autoimmune diseases, viral diseases, diseases with immune modulated mechanisms, and genetically inherited diseases. The diagnosis of this disease is commonly made clinically with histopathological and immunofluorescence investigations.[1,2] Benign Mucous Membrane Pemphigoid (MMP) is one of the VB diseases that mostly affect the mucous membranes. MMP is one of the rare diseases of oral mucous membrane with an incidence of 2-10 cases per 100,000 population.[3,4]

The course of this disease is considered less severe compared to Pemphigus. In this disease, immunoglobulins, i.e., IgG, IgA, and IgM autoantibodies move towards the different antigens such as laminin 332, 311, targeting bullous antigen, collagen type-VII, α6 β4-integrin, and unidentified basal membrane zone antigens in the basement membrane.[5,6] MMP is mostly prevalent in elderly females.[6] Different mucosal sites can be involved, such as oral mucosa, oropharynx, larynx, ocular, and genital mucosa. Sometimes, it also appears on the skin mostly involved head, neck, and upper torso.[1,3] The typical characteristic sign of MMP is the mucosal erosion, blister formation, and followed by scarring.[1,6] Other intra-oral clinical features include vesicles, desquamative gingivitis, erosions covered by pseudomembranous slough, and ulcers.[7]

CASE PRESENTATION

A 48-year-old female patient reported to the outpatient department of Oral and Maxillofacial Pathology of Modern Dental College, Indore, India, with a chief complaint of ulcers in the mouth for eight months (Figure 1). She noticed the appearance of multiple ulcers on the right side of buccal mucosa that healed and reappeared after 10 to 15 days, mostly at the same site, preceded by boils that burst in 3-4 days. History of itching on the scalp was also present. The patient had no history of deleterious oral habits. No recent drug history was reported by the patient. She had no relevant family history.

Figure 1. Clinical Appearance of the Patient

General Examination revealed that the patient was moderately built, cooperative. Vital signs were within the normal range, no sign of pallor in lower palpebral conjunctiva and nails , no sign of edema and cyanosis

reported. The examination of lymph nodes showed bilateral submandibular lymphadenopathy. Extraoral examination showed that lips were competent, no abnormality was detected in TMJ's, no sign of rash or erythema on the skin, and no gross facial asymmetry. Areas of excoriation were present on the scalp.

Intraoral soft tissue examination revealed a grayish-white lesion on the right buccal mucosa with diffuse borders. The lesion was extending anteroposteriorly from the commissure of lips to the retromolar area, superior-inferiorly in the upper and lower buccal vestibule, and interspersed with minute pinpoint ulcers of 0.5 to 2mm in size (Figure 2). Localized desquamation of marginal gingiva was present concerning 45, 46, 47 teeth (Figure 3). The entire lesion was scrapable. However, tissue tags remained with bleeding and tender. Intraoral hard tissue examination showed that patient had missing teeth, i.e., 16, 17, 26, a carious tooth with 46, occlusal facets on 36, 37, 46 teeth and generalized calculus and gingival inflammation. Based on the above-mentioned clinical findings, a provisional diagnosis of Erosive lichen planus and differential diagnosis of Vesiculobulouos Lichen planus, Pemphigus, and Pemphigoid were given.

Figure 2. Clinical Examination of the Lesion

The patient had undergone haematological and urine examination. Blood examination revealed average values for haemoglobin, haematocrit, bleeding, and clotting time, and blood sugar level. The urine analysis report was also found negative. An incisional biopsy specimen was obtained. The specimen was firm in consistency, irregular in shape, and 1.1 x 0.3 x 0.2 cm in size and examined for histopathological features (Figure 4). Histopathology highlighted parakeratinized stratified squamous epithelium of different thicknesses with subepithelial split and degeneration of basal cells

Figure 3. Presence of Localized Desquamation of Marginal Gingiva with respect to 45, 46, 47

in some areas. Inflammatory cell infiltrates, eosinophils, and vascularity seen in connective tissue stroma (Figure 5). A final definitive diagnosis of benign mucous membrane pemphigoid was given based on the clinical findings and investigations. The patient was prescribed triamcinolone acetonide steroid ointment for topical application three times a day and recalled after one month. Improvement was observed after four weeks of steroid application, and then the patient was asked to taper the dose.

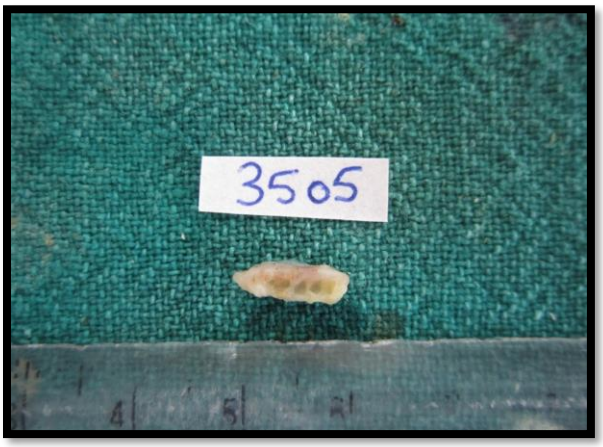

Figure 4. Specimen Obtained for Incisional Biopsy

DISCUSSION

Benign mucous membrane pemphigoid is a group of chronic blistering, mucocutaneous autoimmune diseases in which autoantibodies move against one or more components of the basement membrane. The first case of MMP was reported in 1794 by Wickmann.8 The exact etiology of MMP is still not clear. There are many possible etiological risk factors such as severe

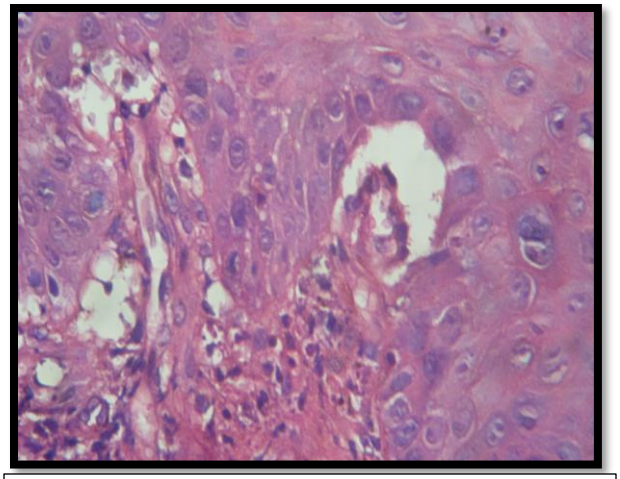

Figure 5. Histopathological Examination of the Lesion

inflammatory injury of the mucosa, drugs (D-penicillamine, indomethacin, clonidine), virus, ultraviolet rays, and genetic susceptibility (biomarker HLA DQB1*03:01) have been reported in the existing literature.9 MMP is an autoimmune, VB lesion in which cytokines and leukocyte enzymes release through complement system by sequestration of neutrophil and followed by cell lysis possibly from complement system, results in loss of adhesion of basal cell-basement membrane leading to the formation of a vesicle under the epithelium.10 Body induced a specific protein such as 168-KDa, α6 integrin which is found exclusively in oral mucous membrane pemphigoid.[11]

MMP occurs mostly between 40 and 50 years, and females are affected more frequently than males by a 2:1 ratio. Oral lesions are the typical characteristic feature seen in most of the patients. It affects mostly oral mucosa (85%), and other mucosae such as nasal mucosa, oropharynx, conjunctiva, and genital mucosa.[12-15] Oral lesions of pemphigoid begin as either vesicles or bullae. The oral blisters rupture, leaving large, superficial, ulcerated, and denuded areas of mucosa. The ulcerated lesions are usually painful and persist for weeks to months if untreated. Gingival involvement produces a clinical reaction pattern termed desquamative gingivitis.[16] The lesion healed with a scar and followed by hyperpigmentation.[15] In some cases, complications such as hoarseness of voice, ocular defect, and airway obstruction may occur.[12,15] Skin lesions are not much common and mostly found on the face, neck, scalp, abdomen, and limbs.[17]

The biopsy of the lesion shows a split between the surface epithelium and the underlying connective tissue. A mild chronic inflammatory cell infiltrate is present in the superficial submucosa. Direct immunofluorescence studies show a continuous linear band of immunoreactions at the basement membrane zone. The immune deposits consist primarily of IgG and C3, although IgA and IgM may also be identified.[18] The topical application of steroids on the lesion is advised. If topical steroids are unsuccessful, systemic steroids plus other immunosuppressive agents can be prescribed.

CONCLUSION:

Based on the different clinical evidence and histopathological findings, mucous membrane pemphigoid resembles a variety of diseases. The investigations for differentiating various types of pemphigoid are specific, expensive, and not routinely used. Therefore, this entity requires a comprehensive clinical, and histopathological evaluation. Early detection and prompt treatment recommended avoiding potential complications.

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ORIGINAL RESEARCH

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Diabetes Case Burden at Central Regional Referral Hospital, Gelephu, Bhutan; A Retrospective Study

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ABSTRACT

BACKGROUND: Diabetes is a metabolic disorder affecting millions of people globally. The incidence of type 2 diabetes is increasing rapidly in Bhutan. Anecdotal evidences show poor compliance and loss to follow up among the Bhutanese population living with diabetes. This study was conducted to understand the case load, age and gender distribution and compliance to follow up among diabetic patients registered at Central Regional Referral Hospital, Gelephu, Bhutan.
MATERIALS & METHOD: All the patients diagnosed and registered with Diabetic Clinic between 1st January 2014 to 31st December 2018 were included in the study.
RESULTS: There was a sharp increase in number of registered diabetic patients from 641 cases in 2014 to 1590 cases in 2018. A total of 949 new cases were diagnosed and registered during the study period of which 52% were women. The overall diabetes prevalence under Gelephu CRRH catchment area is found to be 2.91% with lowest at Chhudzom (1.01%) and highest in Samtenling Gewog (3.18%). Lost to follow up among new cases for past four years was found to be 3.96%, 5.0%, 6.47% and 5.85% from 2015 to 2018 respectively.
CONCLUSION: The ageing population and sedentary lifestyle has contributed to the sharp escalation of type 2 diabetes cases in Gelephu. The hospital recorded total of 1590 cases in 2018 which is a two-fold increase in case load within a span of five years. The current analysis found that loss to follow up was 3.96%, 5.0%, 6.47% and 5.85% from 2015 to 2018 respectively among new cases of diabetes registered with the hospital.

KEYWORDS: Bhutan, Sedentary Lifestyle, Non-Communicable Disease

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia and the late development of vascular and neuropathic complications. Regardless of its cause, the disease is associated with a deficiency in insulin secretion, impaired action or both.[1] The individuals with family history of diabetes, obesity[2], hyperlipidemia, hypertension, sedentary lifestyle and aging population[3] are at risk of developing type 2 diabetes mellitus (T2DM).[4,5] The prevalence of diabetes in rural populations and in men is estimated to be higher than that of urban population and women.[2]

Morbidity and mortality due to non-communicable diseases (NCD); such as diabetes, hypertension, alcohol liver disease (ALD), heart disease and cataract is a global concern and Bhutan is no exception (Bhutan, Annual Health Bulletin, 2017). The prevalence of T2DM for all the age-groups globally was estimated to be 2.8% in the year 2000 and would increase to 4.4% in 2030, increasing the number from 171 million in 2000 to 366 million in 2030. This increase is mostly expected in South Asia[6] which will result in an increased economic burden.[7] India had the highest number of people with diabetes mellitus (31.7 million) followed by China (20.8 million) in the year 2000.[2]

The three group of oral hypoglycemic agents used are insulin secretagogue (sulphonyuria), insulin sensitizer (metformin) and α-glucosidase inhibitor. Metformin is used as first-line treatment for T2DM as a mono-therapy; recommended by American Diabetes Association (ADA) with addition of second-line treatments on the basis of considerations of efficacy, risk of hypoglycemia, weight, side-effects, and costs.[8] Despite an increasing knowledge of the risk factors for T2DM and evidence for successful prevention programmes, the incidence of the disease continues to grow globally. Therefore, early detection through mass health check-up, education and encouraging healthy

habits with the availability of safe and effective therapies will definitely reduce morbidity and mortality due to any NCD, including diabetes.

In Bhutan around 33,000 people are estimated to be suffering from diabetes and the nationwide STEP-wise surveillance (STEPS) survey conducted in 2014 found 6.4% had raised fasting blood glucose.[5] The annual health bulletin 2017 reported that the incidence rate is relatively high with 82 cases per 10000 populations and the number of T2DM cases increased from 4097 in 2012 to 12120 in 2016, an increase by three folds (*http://www.health.gov.bt/*). Apart from T2DM, other non-communicable diseases in Bhutan[5,9] have significantly increased and Central Regional Referral Hospital, Gelephu (CRRH) records the second highest number of diabetes cases in Bhutan.

A country-wide review of diabetes care in Bhutan conducted by Zam et al. in 2015[9] excluded Regional Referral Hospitals in their study and the annual health bulletin published by the Ministry of Health does not present a comprehensive report on diabetes cases. On the other-hand, the study mentioned that almost one-third of DM patients were lost to follow-up (LTFU). Thus, this study is deemed necessary to present the increasing number of diabetic patients visiting the hospital, understand their age and gender distribution and loss to follow up. The study will also facilitate in planning and procurement of reagents and test kits, and medicines.

MATERIALS AND METHOD

Study Design: This was a retrospective study. Using census approach, all the diabetic patients registered with the diabetic clinic of Central Regional Referral Hospital, from 1st January 2014 to 31st December 2018 were included in the study.

Study setting and Laboratory Diagnosis: All patients visiting hospital with clinical symptoms presenting diabetes are screened for diabetes by measuring random blood sugar (RBS). The venous blood samples are collected using fluoride anticoagulant vaccumtainer and tested within 2-3 hours of collection.[10] The normal reference range for RBS is assigned at >200 mg/dl.[9] Further, fasting plasma glucose (FPG) and two hours post prandial plasma glucose (PPPG) is measured for confirmation of T2DM. The set reference value of ≥126 mg/dl in FPG and two hours PPPG ≥ 200 mg/dl is set up for diagnosis of diabetes.[9,11]

Registration and recording: The diabetic clinic of the hospital registers all diabetic patients and assigns a unique identification number, either as old case or new case (Old case: Those diabetes patients already diagnosed and registered with the diabetic clinic of CRRH or other hospitals and have been allotted with a D-number. New case: Those patients initially diagnosed as T2DM is through two fasting plasma glucose (FPG) measurements, (both of which must be ≥126 mg/dl) and two hours post prandial plasma glucose (PPPG) ≥ 200 mg/dl).

Treatment and Advice: Diabetic patients are advised on lifestyle modification and importance of physical activity and dietary control. They are prescribed oral drugs like metformin, glipezide and insulin, in the form of human (soluble) insulin, human zinc suspension and human mixtard (neutral isophane).[5] Since diabetes is associated with other co-morbidities such as hypertension, they are managed accordingly.

Follow up: Diabetes patients are expected to visit diabetic clinic for follow-up once in a month as per the national standard of Managing Diabetes Mellitus: Guide for health workers (2007), Department of Medical Services, Ministry of Health. Although there are no formal definitions to final outcome of diabetic patients; it may be limited to; alive and retained in care, lost–to-follow-up (LTFU) and died. A patient is considered LTFU if the patient did not visit the diabetic clinic even once within a year of diagnosis and registration with the diabetic clinic.

Data Analysis: The data were collected from Diabetic clinic, CRRH and validated with the medical records section of the hospital. Data entry was done using Microsoft excel and analyzed using SPSS. Descriptive information is presented as frequency and percent. Chi square test was used to assess the association between gender and different age groups considering a p-value of <0.05 as statistically significant. The annual diabetes detection rate was calculated based on the total annual random blood sugar tested by laboratory and total new cases detected annually.

Ethical Clearance: Ethical clearance was granted by

Research Ethics Board of Health (REBH), Ministry of Health, Bhutan vide letter no: Ref. No. REBH/Approval/2019/017 dated 09/05/ 2019.

RESULTS

The number of diabetes patients registered with diabetic clinic, CRRH has increased from 641 old cases in 2014 to 1590 in 2018. During the study period (2014-2018), a total of 949 new diabetes mellitus cases were recorded in diabetic clinic CRRH [figure 1 (a)], of which 52% were women [figure 1 (b)]. More than 59.51% of new T2DM cases detected were of age group ≥50 years old and it was found to be statistically significant ($p<0.05$) [figure 2 (a)].

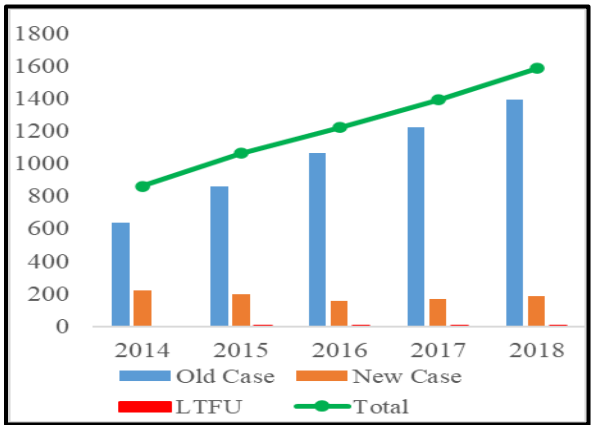

Figure 1 (a). Annual total T2DM cases detected in CRRH, Gelephu from 2014-2018 and Loss to follow-up (LTFU)

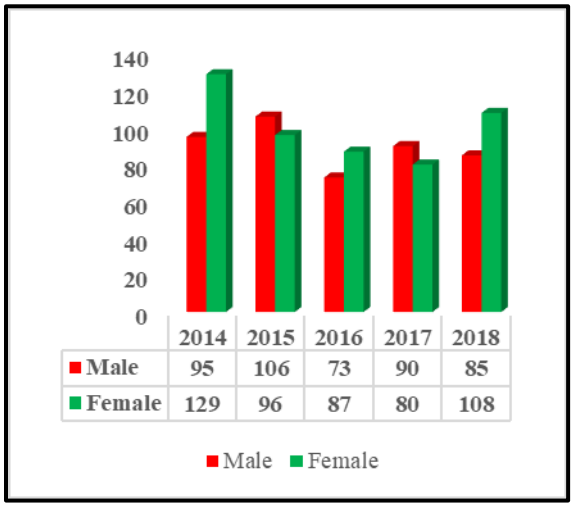

Figure 1 (b). Annual total T2DM cases detected in CRRH, Gelephu from 2014-2018 and Loss to follow-up (LTFU)

The annual detection rate was estimated to be at 2.22% and 1.45% in 2015 and 2018, respectively [figure 2 (b)]. The result of LTFU for past four years shows only 3.96%, 5.0%, 6.47% and 5.85% of new diabetes cases were lost to follow-up in 2015 to 2018, respectively.

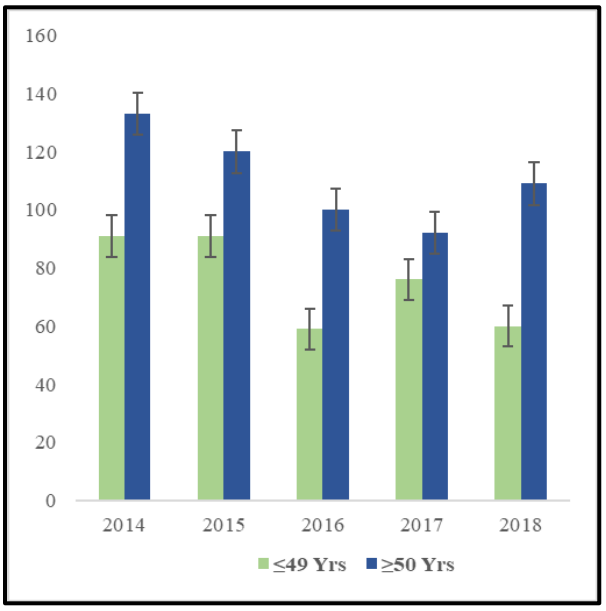

Figure 2 (a). Age group distribution of new T2DM cases detected in CRRH (2014-2018)

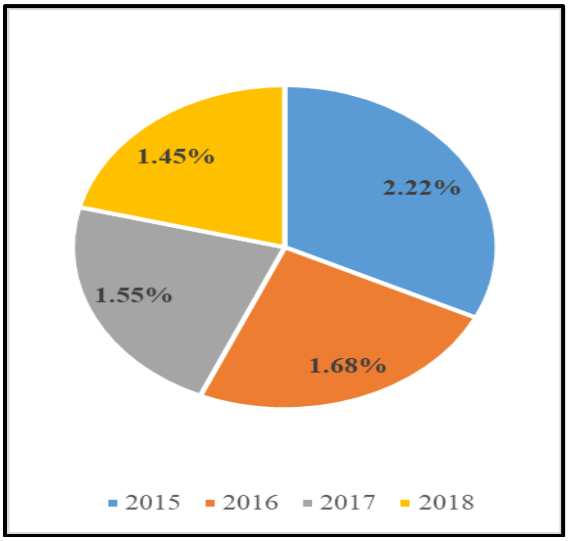

Figure 2 (b). Annual T2DM detection rate at CRRH from 2014 to 2018

DISCUSSION

The number of diabetes cases has increased by more than two folds from 641 cases in 2014 to 1590 cases in

2018, with 949 new cases being detected within the study period. Similarly, the incidence of diabetic patients being referred from neighbouring districts increased from 1042 in 2015 to 1535 in 2018 (figure 3). This adds up significant work load to the hospital. Gelephu hospital examines the second highest number of OPD cases in the country.[12] The sharp escalation of T2DM has been observed in South East Asian region.[13] T2DM is mostly associated with change in lifestyle due to urbanization. Co-incidentally Gelephu has turned to Class A-urban town in last one decade with multiple industries and gradual rise in the population size. The other risk factors associated includes; social factors, social and cultural taboos, environmental factors, sedentary life style, genetic and risk factors.[13]

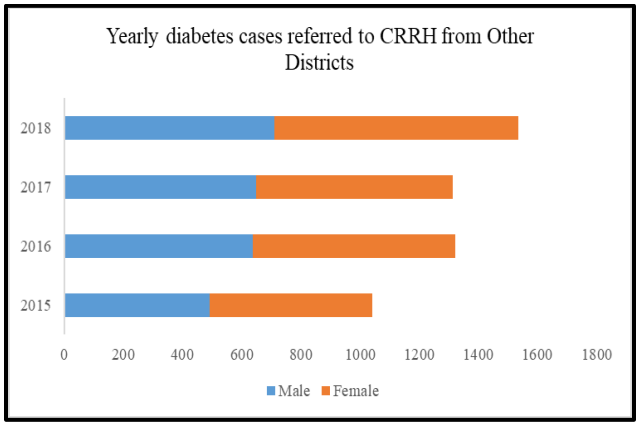

Figure 3. Diabetes cases referred to CRRH Diabetic clinic from other districts

This study found 52% of the diabetic patients were female. This is in consistence to the finding reported by an earlier study.[9] Obesity is a major risk factor for T2DM[14,15] and it confers increased risk for T2DM through the mechanism of associated insulin resistance. The WHO-Bhutan factsheet presents 40% of Bhutanese women are either overweight or obese whereas 27% of men were reported to be either overweight or obese.[16] A study conducted in eastern part of Bhutan among secondary school students reported a higher prevalence of obesity in adolescent female population.[17] On the other hand, T1DM is significantly low in CRRH, only three cases of T1DM were recorded in last 5 years at CRRH.

Population ageing has set in Bhutan.[18] The current study found that 59.51% of new cases of diabetes were ≥50 years. Ageing society also plays a critical role in moderation of lifestyle related diseases. There was a stark increase in elderly population by 79.48% between 2005 and 2017.[15] The increasing life expectancy will also contribute to predicted upsurge in regional diabetes rate. Diabetes and other NCDs can also lead to old age mental illness (WHO, 2012). Therefore, treating NCDs among the elderly population may be done within the purview of addressing mental health conditions.

The International Diabetes Federation (IDF) atlas projects the total number of diabetes cases in Bhutan to be over 41000 and national prevalence rate to be 7.7%.[13] However, the overall diabetes prevalence under the CRRH catchment area is found to be 2.91% with lowest at Chhudzom Gewog (1.01%) and highest in Samtenling Gewog (3.18%), as shown in figure 4. The annual detection rate is estimated to be 2.22% and 1.45% in 2015 and 2018 respectively. This calls for more proactive public health awareness and screening campaign to clear the estimated detection gap.

Although the anecdotal evidences say that many patients do not visit the DM clinics regularly and there is considerable LTFU and the earlier study by Zam et al., (2015)[9] found 21% of the diabetes patients were LTFU in Bhutan but the current analysis found only 3.96%, 5.0%, 6.47% and 5.85% of new diabetes cases were LTFU from 2015 to 2018 respectively. This is comparatively lower and the decrease could be attributed to proper health education to patients, good laboratory testing facility and dedicated clinic for diabetes patients operating 5 days a week. Moreover, diabetic patients not reporting to clinic for more than four months are being followed up telephonically.

Diabetes along with other co-morbidities such as high blood pressure is a major factor contributing to the occurrence of chronic kidney diseases.[5] Bhutan still refers chronic kidney disease patients abroad for treatment and the number keeps increasing annually by 15%.[5] Though Bhutan will be soon graduating from low to middle income country, the rising cases of diabetes and other NCDs poses a threat to the sustainability of our free health care system. Maintaining a free health care system is enshrined in the Constitution of the Kingdom of Bhutan.[19]

Limitations: The study was not able to extract data on conversion rate from pre-diabetes to diabetes. The data

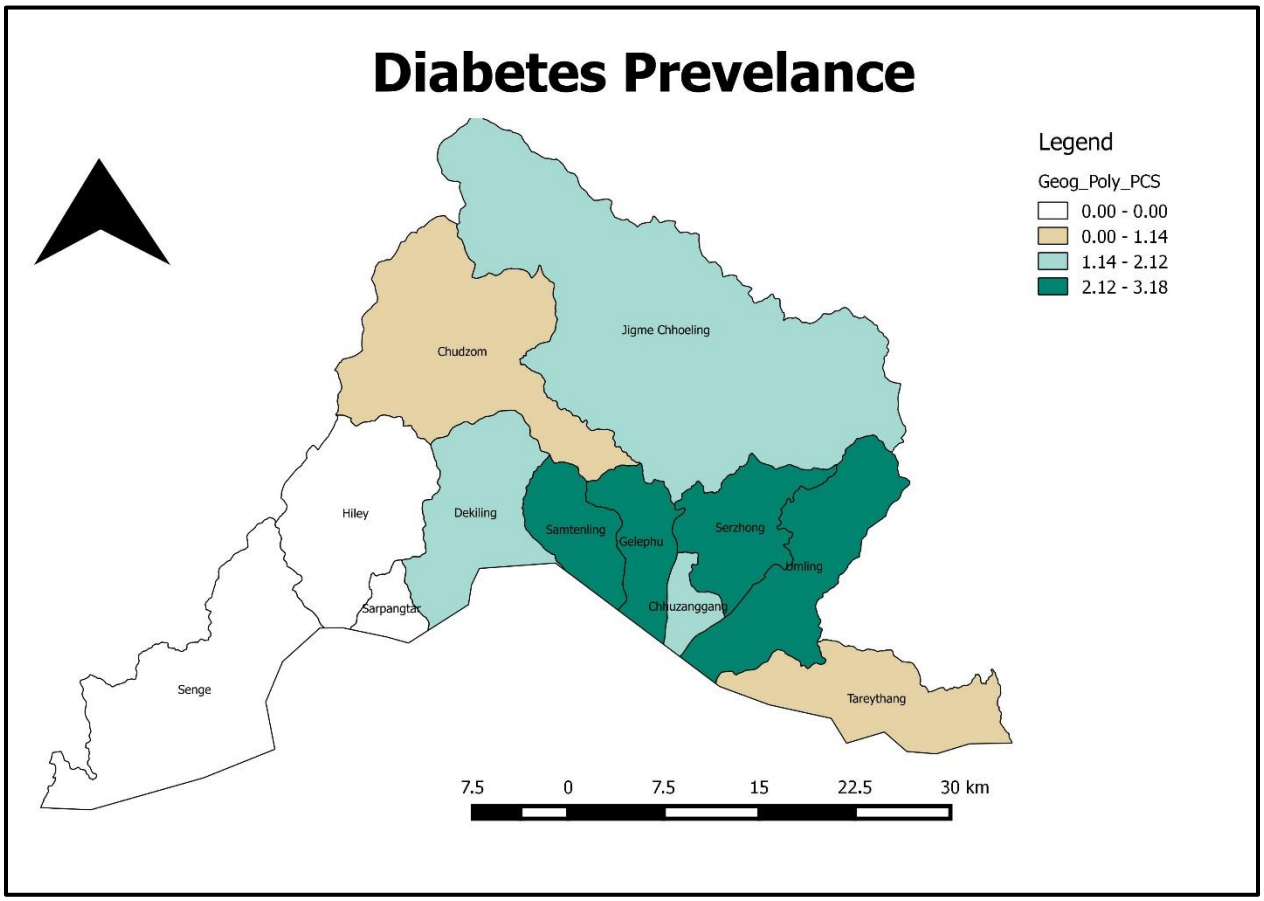

Figure 4. Prevalence of Diabetes at Gewogs under Gelephu CRRH
(Note: Sengye, Hiley, Sarpangtar Gewog not a catchment area under Gelephu, CRRH)

on LTFU for 2014 was unavailable.

CONCLUSION

The ageing population and change in lifestyle has contributed to rise in the number of T2DM cases in Bhutan. CRRH recorded 1590 cases in 2018 with an increase of two-fold within the span of five years. The overall diabetes prevalence under the CRRH catchment area is found to be 2.91% with lowest at Chhudzom Gewog (1.01%) and highest in Samtenling Gewog (3.18%). The study found that only 3.96%, 5.0%, 6.47% and 5.85% of new diabetes cases were lost to follow up from 2015 to 2018 respectively. The study recommends strengthening community awareness and screening programs for early case detection and management.

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ORIGINAL RESEARCH

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Associating Use of Digital Technology and Self-Reported Health Problems among College Going Students in Delhi-NCR, India

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ABSTRACT

INTRODUCTION: The increased use of digital media among college students has the tendency to cause various health problems based on the duration and medium used.
AIM: To assess the use of digital technology and self- reported health problems among college going students in Delhi-NCR, India
MATERIALS AND METHODS: Data was collected using a pre-tested and pre-validated questionnaire which was divided into three sections. The first section contained seven questions regarding demographic details, the second contained three questions regarding the device used, hours spent and the type of media assessed, while the third contained twelve questions regarding self-reported adverse events while accessing digital media. Statistical tests involved the Shapiro-Wilk test, Independent samples t-test, multivariate linear regression and the Pearson's correlation coefficient. The analysis was done using SPSS version 19.0.
RESULTS: Responses of 717 students were included in the final analysis. Most of the students were between 17-19 years (53.9%), the primary device used was smartphone (91.8%). Most students used their device for >1-4 hours (34.6%). The most common self-reported symptom was back and/or neck pain (18.4%) followed by sleep issues/ insomnia (17.7%) and headache (17.3). Multiple linear regression model revealed that good knowledge scores were significantly associated with age($p = 0.04$) and the duration of device used ($p = 0.02$). A positive, linear, great strength of association ($r: +0.747$) and a significant relationship ($p = 0.037$) was found between self-reported health problems and the hours of device usage.
CONCLUSION: It is advised that college students be advised regarding the ill effects of digital medium without taking proper precautions.

KEYWORDS: Health, Technology, Back Pain

INTRODUCTION

The use of digital media has grown exponentially over the years and most of its usage can be attributed to the use of the smart phone, which was once looked upon as a luxury commodity.[1] As per a recent study, young individuals have been pervasively using digital medium tools and especially social media for a variety of reasons which include entertainment, social enhancement, identity formation, and maintaining interpersonal connections.[2]

The launch of affordable 4G services and devices in the Indian market has made high speed constant internet a reality for all. It finds use in fields of education, marketing, communication and so forth. Various researchers have put forth the suggestion that social media has the ability provide users with a platform that overcomes barriers of distance and time to connect and reconnect with others and thereby expand and strengthen their offline networks and interactions.[3-5]

The world wide web today has approximately more than one billion active users, and it is estimated that in the future, this number will significantly increase, especially in developing countries. This is supported by the fact that the use of social media is prevalent across all ages and professions and is pervasive around the world.[6]

However, few researchers have associated use of digital medium with several psychiatric disorders, examples of which include depressive symptoms, anxiety, and low self-esteem. Such effects depend on many factors such as the type and duration of the used device. A few milder and initial symptoms while using digital media include headache, eye pain, postural problems, insomnia, etc.[7]

With the use of digital content on the rise, users are spending an increased time on their devices, and this

has the potential to affect their health and hence, the present study was undertaken with the aim to assess the use of digital technology and self- reported health problems among college going students in Delhi-NCR, India

MATERIALS AND METHOD

Prior to implementation of this study, the questionnaire designing, validation, pilot study and strategies for maximum participation were discussed. The main instrument to collect data was a pre-validated and pre-tested questionnaire containing three sections and after ethical approval, was distributed to students. Necessary permissions from the management of the concerned institutions were duly obtained. The first section contained seven questions regarding demographic details, the second contained three questions regarding the device used, hours spent and the type of media assessed, while the third contained twelve questions regarding self-reported adverse events while accessing digital media. The first page of the questionnaire assured confidentiality of data, informed the study objectives and stated that participation was purely voluntary. The consent to participate (inclusion criteria) was implied when the students agreed to answer the questionnaire and they had complete freedom to decline at any time. Access to data was only to the principal investigator and no personal details (e-mail id, phone number, name etc.) were asked. Among total submissions, if a student failed to answer ≥1 question, it was excluded from the analysis.

The study duration was from 01st October 2016 to 28th February, 2017 (5 months) through convenience sampling so that maximum participation could be ensured. The questionnaire was distributed personally and a pilot study was done on 25 participants to validate the questionnaire and its Cronbach alpha (α) was found to be .69. The pilot study responses and incomplete responses were excluded from the main analysis.

Data analysis included tests for normalcy Shapiro-Wilk test, Independent samples t-test, multivariate linear regression and the Pearson's correlation coefficient. Coded data was sent to the statistician so that confidentially of the data could be maintained. The analysis was done using SPSS version 19.0.[8]

RESULTS

The response rate of the present study was 79.8% as of a total of 899 responses recorded, only 717 were complete responses and hence, were subsequently analysed.

Age characteristics and device used for accessing social media (Table 1)

Most of the students belonged to 17-19 years (53.9%) while the least belonged to >25 years of age (14.4%). The primary device used for accessing social media was smartphone (91.8%) followed by laptop (6.8%) and tablet (1.4%).

VARIABLE	n,%
AGE (in years)	
17-19	387 (53.9)
20-22	101 (14.1)
23-25	126 (17.6)
>25	103 (14.4)
PRIMARY DEVICE USED	
Smartphone	658 (91.8)
Laptop	49 (6.8)
Tablet	10 (1.4)

Table 1. Age Characteristics and Device Used for Accessing Social Media among the Students

Device duration and Use (Table 2)

It was observed that most students used their device for >1-4 hours (34.6%). Only 7.7 % of the participants used their device for >8 hours. The most commonly used digital medium used was Social media (35.9%) followed by YouTube(24.8%), music(14.1%) and movies(11.4%).

VARIABLE	n,%
DAILY USAGE OF DEVICE	
<1 Hour	134 (18.7)
>1- 4 Hours	248 (34.6)
4-6 hours	147 (20.5)
6-8 hours	133 (18.5)
>8 hours	55 (7.7)
MAIN USE	
Social Media (Including Social Messaging Apps)	258 (35.9)
Games	47 (6.5)
Youtube	178 (24.8)
Movies	82 (11.4)
Music	101 (14.1)
Other	51 (7.3)

Table 2. Device Duration and Use among Students

Self-Reported Symptom(s)	<1 hour	1-4 Hours	4-6 hours	6-8 hours	> 8hours	Total	p Value
Headache	15(11.2%)	43 (17.3%)	36(24.5%)	21(15.8%)	9 (16.4%)	124 (17.3%)	NS
Eye Pain	26(19.4%)	56(22.5%)	18(12.2%)	10(7.5%)	7 (12.7%)	117 (16.3%)	0.01*
Blurry Vision	12(8.9%)	9(3.6%)	13 (8.8%)	11 (8.3%)	5 (9.1%)	50 (6.9%)	NS
Sleep Issues/ Insomnia	34(25.8%)	35(14.1%)	23 (15.6%)	29 (21.8%)	6 (10.9%)	127 (17.7%)	0.04*
Back and/or Neck pain	12(8.9%)	58(23.4%)	33 (22.4%)	20 (15.0%)	9 (16.4%)	132 (18.4%)	0.04*
Painful Fingers	22(16.4%)	12(4.8%)	5 (3.4%)	19 (14.3%)	6 (10.9%)	64 (8.9%)	NS
Tiredness and/or Lethargy	10(7.2%)	28(11.3%)	16 (10.8%)	20 (15.0%)	7 (12.7%)	81 (11.3%)	NS
Hearing Problems	3 (2.2)	7(3.0%)	3 (2.3%)	3 (%)	6(10.9%)	22 (3.2%)	NS
Total	134 (100%)	248 (100%)	147 (100%)	133 (100%)	55 (100%)	717 (100%)	--

Table 3. Self-Reported Symptoms of the Students on the Basis of Duration Spent on Digital Media (NS: Non-significant)

Self-reported symptoms of the study respondents on the basis of duration spent on digital media (Table 3)

It was observed that overall the most common self-reported symptom was back and/or neck pain (18.4%) followed by sleep issues/ insomnia (17.7%) and headache (17.3). The least symptom reported was hearing problems (3.2%). The association between eye pain(p=0.01), sleep issues/ insomnia(p=0.04) and back and/or neck pain(p=0.04) was found to be statistically significant to the duration spent by the patients on digital learning.

Association between self-reported problems, age and duration of device usage (Table 4).

The multiple linear regression model to analyze the Association between d Self-Reported Problems, age and Duration of device used revealed that good knowledge scores were significantly associated with age(p = 0.04) and the duration of device used (p = 0.02).

Relationship between self-reported health problems and hours of device usage (Table 5)

A positive, linear, great strength of association (r: +0.747) and a significant relationship (p = 0.037) was found between Self-reported health problems and the hours of device usage using the Pearson's correlation coefficient (Table 5).

Predictor	Coefficient	SD	t	P value
Self-Reported Problems				
Constant	44.27	5.26	67.21	0.00
Age	-4.32	3.11	-1.43	0.04*
Duration of Device Used	1.09	0.33	1.00	0.02*

Table 4. Association between Self-Reported Problems, Age and Duration of Device Usage

DISCUSSION

In the present study, it was revealed that the most common health problem reported among college going students in Delhi-NCR, India was Back and/or Neck pain (18.4 %) and this primarily is due to poor posture while using their devices. This finding is also suggestive of the fact that students prefer viewing comfort more than postural comfort. These results is in agreement with Dol KS who reported that 21.1 % and 31.4% of university students complained of pain in their shoulder and neck due to usage of internet, respectively.[9] Similar results were also observed by Waersted M et al.[10] However, it was observed by Madeleine P et al.[11] among computer users that the hand and forearm regions were more susceptible to physical pain resulting from computer as compared to

Relationship Between		Karl Pearson's coefficient of correlation	CI	P Value
Self-reported health problems	Hours of Device Usage	+ 0.747	0.87-45.84	0.037*

Table 5. Relationship Between Self-Reported Health Problems and Hours of Device Usage

the neck/back region.

Most of the students(34.6%) reported using digital media for 1-4 hours on an average. Such durations are acceptable as usually the college gets over in the afternoon/early evening and in particular mobile/laptop usage in college premises except for educational purposes is not allowed. Such results are consistent with Anderson KJ et al.[12] who stated that the typical Internet-using student uses the internet for 100 minutes per day. Similarly, Perry TT et al. reported that 43.8% of university students used the internet for atleast one hour a day.[13] In contrast, Wang Q et al.[14] reported that that 45% of the college students admitted that they were spending spent 6-8 hours per day checking social media sites, while 23% spent more than 8 hours; 20% spent 2-4 hours and only 12% spent less than 2 hours on this task. The results indicate that students need to be constantly reminded about the duration of their course regarding the benefits of physical exercise.

It was observed that social media (35.9%) was the most preferred digital media used by the students and is in agreement to Sponcil M et al. who reported that 45% of college students are using social media site at least once a day.[15] This is consistent with the statement that the use of internet is increasing over time. Such figures are also expected to rise as universities include online courses for their students.

This study is prone to certain limitations, one of them being the lack of generalizability due to the selection of a convenience sample. There is also a tendency to either over or under-report self-reported health problems which might have affected the results. However, the possibility for such an event was significantly redcued as confidentiality of the data was assured and no personal data was obtained from the students. Despite such limitations, the results of the present study promotes future opportunities and adds data to existing literature documenting the self-reported health problems and digital media usage among college students.

CONCLUSION

With the results of the present study, it is important that college students be advised regarding the ill effects on the used of digital medium without taking proper precautions. The need of the hour is to educate the students and encouraging them to limit their use and adopt healthy lifestyle choices.

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