Ilkogretim Online - Elementary Education Online, 2020; Vol 19 (Issue 2): pp. 2122-2132
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2020.02.696796

A Study On Occupational Rhinitis Among School Teachers In Suburban Areas Of Chennai

Vedanayagi.R[1] , Vincent Prasanna[2] , Rajarajan.S[3] , Renukadevi.S[4]

[1]Student,

[2] Professor, Department of ENT, Tagore Medical college and Hospital, Chennai.

[3]Professor, Department of Electronics and Communication Engineering, Sri Sai Ram Institute of Technology,Chennai,

[4]Asst.Professor,Department of Mathematics, Bharathi Women's College, Chennai.

Abstract: Rhinitis is the common condition of irritation and inflammation of the mucus membrane inside the nose. Rhinitis can be caused by infection, allergies, air pollution, or structural problems in the nose. This causes mucus and pus to fill up the nose and sinus cavities and causes pain in the face, plugged nose, thick nasal mucous and irritation. Rhinitis is also caused due to air pollution (dust) and thus rhinitis occurrence is strongly dependent on person's occupation. Occupational rhinitis is specific for those working in industries (textile, wood carving, asbestos, fertilizer industry etc.,), construction worker and also found to be prevalent among teachers. Our zone of interest lies on teachers who are exposed to dust (chalk powder) due to frequent use of the chalk piece. Chalk dust could be harmful causing rhinitis, lacrimation and breathing problems in long run. Present work was attempted to discover the positivity of various symptoms which includes coughing, sneezing, sore throat, nasal drainage, eye irritation, nasal blockage, headache, asthma, palate itching, loss of smell and its influences on teachers in the occurrence of rhinitis. Therefore the aim of this study is to determine the effect of occupational exposure to chalk dust on occurrence of rhinitis in teachers.

Key words: Occupational Rhinitis, Machine learning algorithm, Teaching, Systematic random samples

I.INTRODUCTION

The powdered, fine particles of the chalk could accumulate in the respiratory system, leading to difficulty in breathing, Chest pain on over exposure. There is more chance of occurrence of allergy towards the chalk dust(allergen).The symptoms of allergy includes coughing, sneezing, sore throat, nasal drainage, irritation in eyes, nasal blockage, headache, asthma, palate itching, loss of smell etc,. Thus symptoms immediately occur to those exposed to the allergen. Some symptoms like headache and fatigue occurs due to long -term exposure to allergens. The histamine (natural chemical) defends the body from these allergens. In this study it is found that the chalk piece powder acts as allergen causing those symptoms in teachers, due to their chronic exposure to dust. Based on previous reports, the teachers using chalk and talk pedagogy are prone to pulmonary function impairments and therefore it is necessary to change the pedagogy. Chalks and shaded chalks comprise of limestone and few metals respectively. The long time exposure to these components of chalk caused respiratory side effects, interstitial pneumonia for assembly line workers and school teachers as well.

Wearing confront covers for teachers and keeping a proper separation from writing slate(black board) for understudies amid chalk educating is exceptionally prescribed. The outcome exhibits that anti-dust chalk can also produce significant amount of chalk dust in the nearness of the black board especially when the chalk was wiped off from the writing board. During lectures there is increased breath rate, which causes inhalation of chalk dust and that is the reason why many teachers are suffering from eye and throat irritation. This information led us to take up further studies on occupational rhinitis among teachers due to prolonged exposure to chalk dust.

Occupational rhinitis is demonstrated that it is more frequent than occupational asthma [1].The release of chalk powder during dusting, enters respiratory system through nasopharyngeal region and mouth could be harmful to teachers who are in the close proximity of black board [2]. Due to heaviness of the dust particles, they fall to the floor rather than hanging in the air [3,4,23]. These chalk dust gets settled in respiratory tract and results in the increased incidence of occupational rhinitis and also show adverse effects on allergic teachers and children [5, 15, 17]. But, chalk and board pedagogy is one of the most familiar pedagogies in schools across the world [4,5,11]. Obviously, rhinitis is the main clinical entity in developing asthma [6,7,8,19]. A variety of organic as well as inorganic compounds in the workplace develop occupational rhinitis [9,10,22],which has attention as an occupational disease in the recent years. The harmful upper airway disease has been identified as the outcome of some of the work floor substances with proven demonstrations [12,13,20,22].Obviously, exposure reduction is the prevention of occupational rhinitis [14,16,23], and which leads to improvement in health, productivity, quality of life and arrest of occupational asthma [17,18,21]. In this study, an attempt was made to find the frequency of occurrence of rhinitis in following the chalk and talk method of teaching.

II.MATERIAL AND METHODS

This is a questionnaire based Observational and Cross-sectional study which was conducted in schools in suburban areas around Chennai. The samples were obtained from teachers from different taluks (Pallavaram, Alandur, Tambaram, Sriperumpudur, Sholinganallur, Chengalpet). This survey was conducted for teachers to measure the frequency of occurrence of occupational rhinitis due to prolonged exposure to chalk dust. The respondents are also selected using the Systematic Random Samples (SRS) method from the most updated staff rolls. For this study, around 325 Systematic Random Samples are required for result with 95% conservative confidence interval. Totally 341 samples are obtained that provides us further accurate analysis for the study.

Inclusion criteria: With the written consent, 341 teachers within the age group of 20-50 years, those who are having atleast one year experience, primarily using chalk and talk pedagogy for an average of fifteen hours per week, have been included in this study.

Exclusion criteria: The teacherswith short experience in service and teachers travelling long distance (exposed to dust), smokers, and respiratory patients were excluded in this study.

Informed consent procedure: This study on occupational rhinitis among teachers is a questionnaire based study. Schools situated in suburban areas around Chennai were randomly selected

and the head of the institution is approached with this study proposal. The institutions which agree to conduct the study among teachers have been included with an informed written consent. In order to minimize the risk of sampling error, proper explanation about the study was given to participating teachers from various school and their responses were obtained through the questionnaire. The questionnaire was carefully, scientifically designed in English. The questionnaire collects information on the socio-demographic profile, their teaching experience, average number of classes taken per day, methods of teaching(chalk and talk, OHP/LCD Projector, activity based methods), symptoms of rhinitis, previous sinus treatment history, and questions on home and work environment. The questionnaire contained simple close-ended questions that made the respondents feel comfortable in answering. The oral translation was carefully monitored, so that a question to one teacher will not have a different meaning to another. The samples were grouped based on their teaching experience, age group, teaching subjects, and the familial incidence of rhinitis. The obtained responses were analyzed carefully and relation of occurrence of rhinitis symptoms with the teacher's experience was correlated.

Ethical consideration and confidentiality: Institutional ethical committee approval was obtained before starting the study. Confidentiality of the data collected from participants is maintained in all phases of the study.

III.RESULTS

The Study was conducted at different teaching institutes which included schools and few colleges from sub - urban areas in Chennai, with chalk and talk as teaching pedagogy. Out of 341 participants, 258 were females, 80 were males, and 3 were trans-genders. After getting the informed consent, teachers were given the questionnaire. As mentioned earlier ,the questionnaire collects information on the socio-demographic profile, their teaching experience, average number of classes taken per day, methods of teaching (chalk and talk, OHP/LCD Projector, activity based methods), symptoms of rhinitis (cough, sinus related symptoms-facial pain/pressure, facial congestion/fullness, cold, sneezing, sore throat, nasal drainage, eye symptoms, wheezing, headache, asthma, ear problems, palate itching, nasal blockage, sinus infection, loss of smell), previous sinus treatment history, and questions on home and work environment. The obtained responses were grouped and analyzed. The fig.1 shows the percentage of teachers in specific age groups.

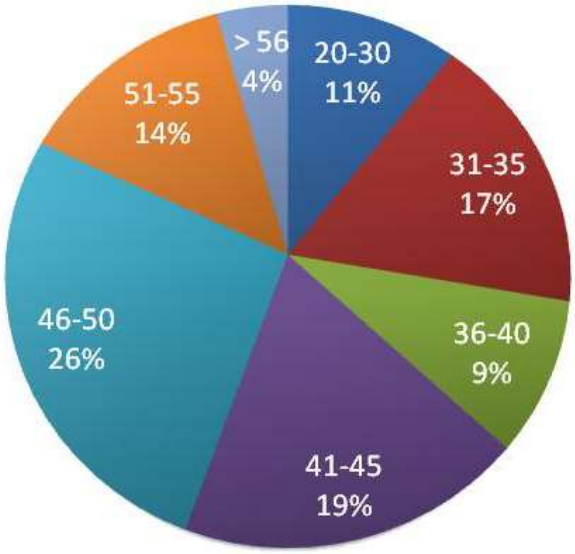


Fig.1: Percentage of participated teachers in specific age groups

The frequency of occurrence of rhinitis symptoms in each age group is analyzed and the chart is obtained. The following fig.2 shows the presence of sinus related complaints of teachers in each age groups and the rhinitis symptoms are seems to be higher in age group 36-40(68%), 51-55(60.86%), above 56(60%), 41-45(57%), 31-35(39%), 20-30(30%).

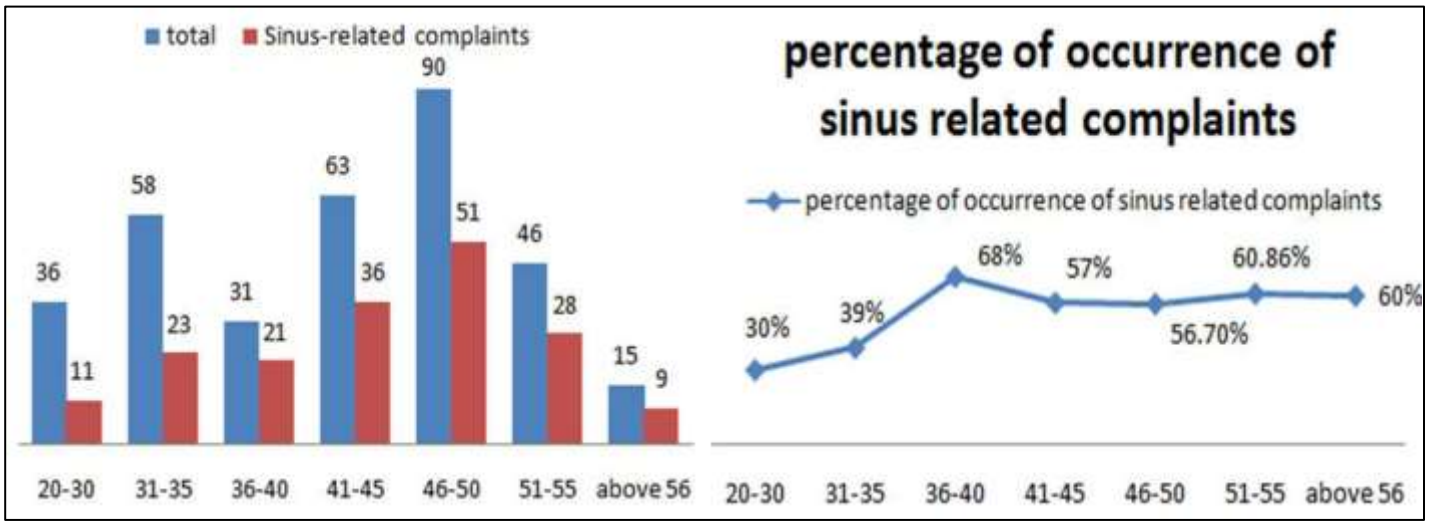


Fig. 2: Age-wise sinus affected Teachers in Percentage

On categorization of samples, the presence of sinus related complaints and sinus infection were analyzed in each category of male, female, and transgender. It is observed results are shown in Table1.

Table 1: Categorization based on gender

Gender	Total	Sinus related complaints	Sinus infection
Female	258	132	73
Male	80	35	28
Transgender	3	2	1

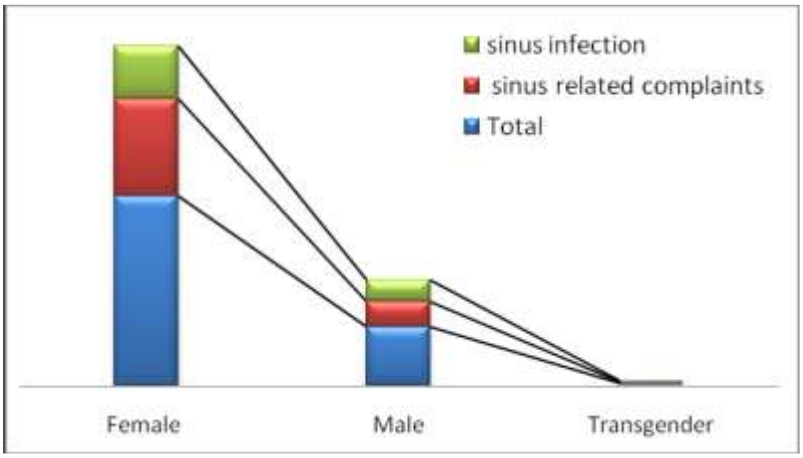


Fig.3: Occurrence of sinus related complaints and sinus infection in each category

Out of 341 samples obtained, 326 samples around 95.60% of teachers follow chalk and talk pedagogy along with other teaching methods like OHP/LCD Projector, and activity based learning. The effect of prolonged exposure to the chalk dust is estimated through the occurrence of rhinitis symptoms. Among 326 teachers, 169 (51.84%) presents with the sinus related complaints. Thus, fig.4 shows the percentage of occurrence of rhinitis symptoms in those teachers following chalk and talk pedagogy.

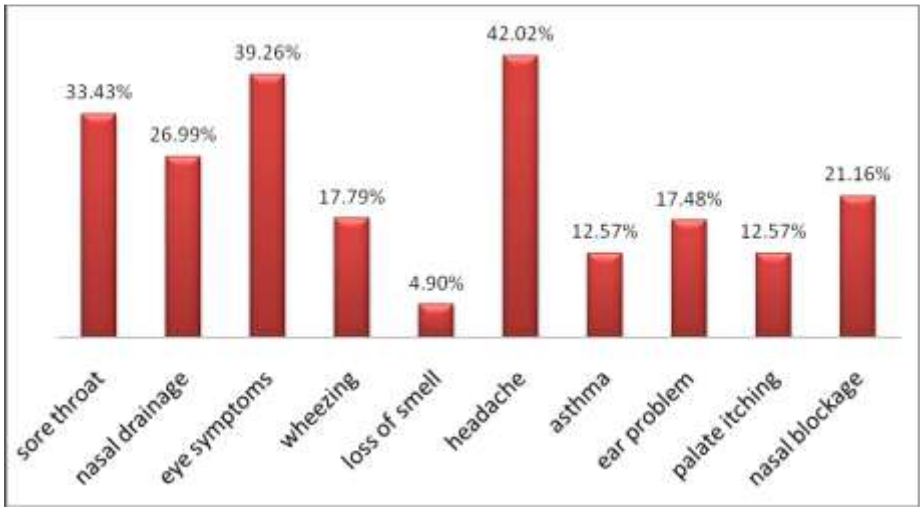


Fig.4: Occurrence of symptoms of rhinitis with sinus related complaints (%)

There is increased eye symptoms and headache in teachers following chalk and talk pedagogy. This is due to the prolonged exposure to chalk dust that settles in the respiratory tract, which the body cannot exclude effectively. The smoking, atopy and level of exposure are the potential determinants for Occupational Rhinitis. Excluding smoking and atopic conditions, the objective is to determine the

relativity of level of exposure to the occurrence of rhinitis symptoms. The period of exposure to chalk dust depends on the experience of teachers.

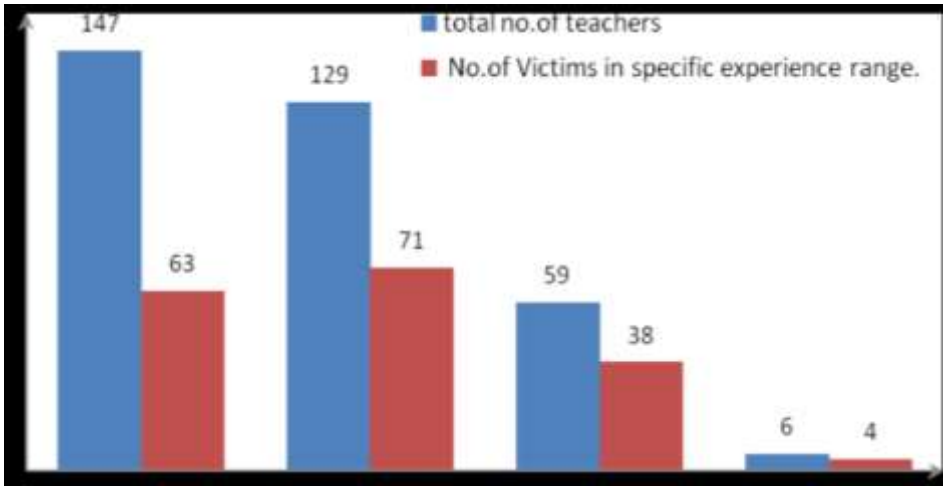
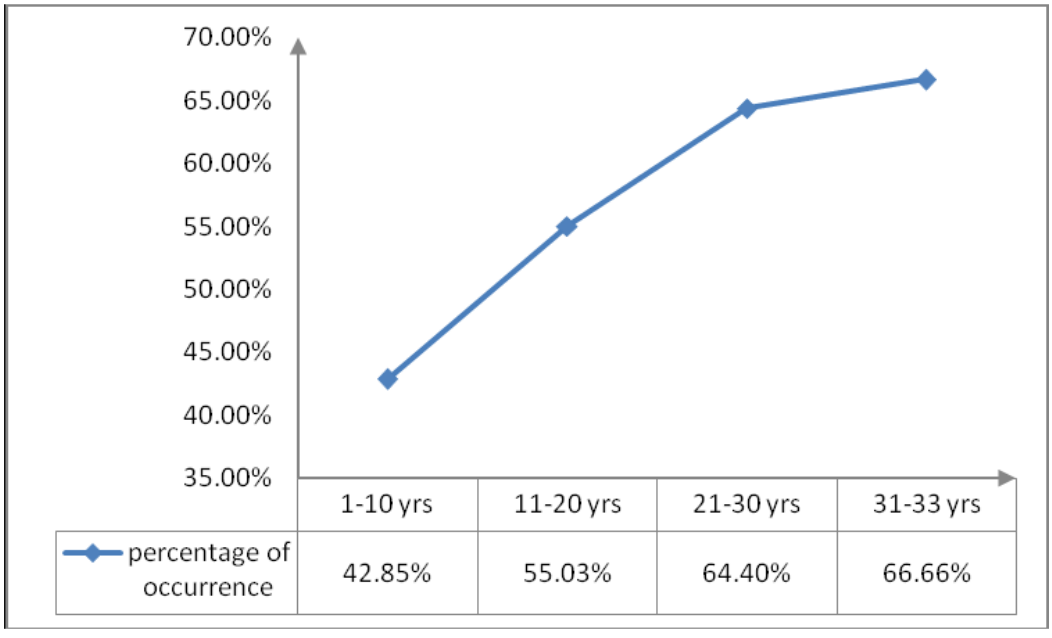


Fig. 5: Occurrence of sinus related complaints in each experience range

Sinus related complaints are found to be highest (66.66%) in teacher with experience 31-33 years and its frequency of occurrence increases with increase in their teaching experience. Fig.6 shows the percentage of occurrence of sinus related complaints in specific teaching experience category.



	1-10 yrs	11-20 yrs	21-30 yrs	31-33 yrs
percentage of occurrence	42.85%	55.03%	64.40%	66.66%

Fig. 6: Percentage of sinus related complaints in specific range of experience (%)

About 51.84% of samples using chalk and talk pedagogy were found to present with sinus related complaints. Since there are chances of non-occupational rhinitis due to familialinheritance, this chart (fig.7) shows the minimum relation of sinus related complaints due to hereditary condition.

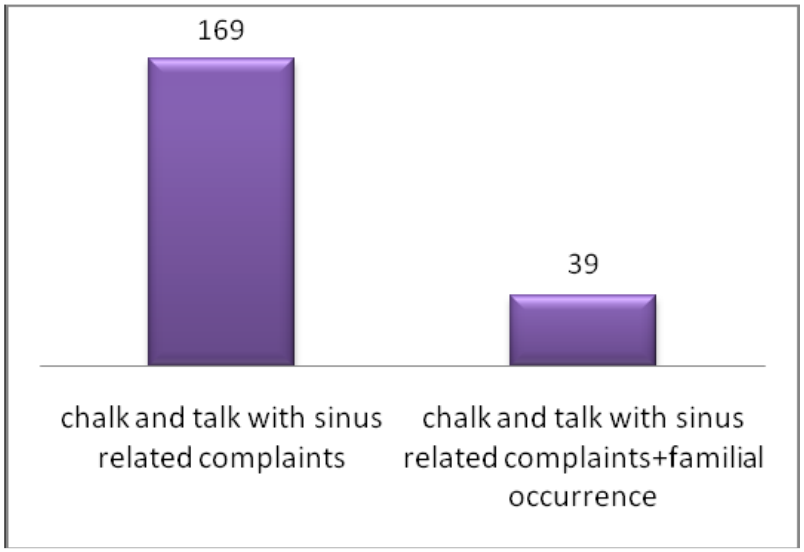


Fig.7: Relation of chalk and talk pedagogy with sinus related complaints and its familial occurrence.

In teachers using chalk and talk method, about 21.14% of teachers were found with sinus related complaints and sinus infection (rhinitis symptoms). Of these 29 teachers present with known sinus problem and 15 samples show the presence of known sinus problem with history of familial occurrence, and shown in fig.8.

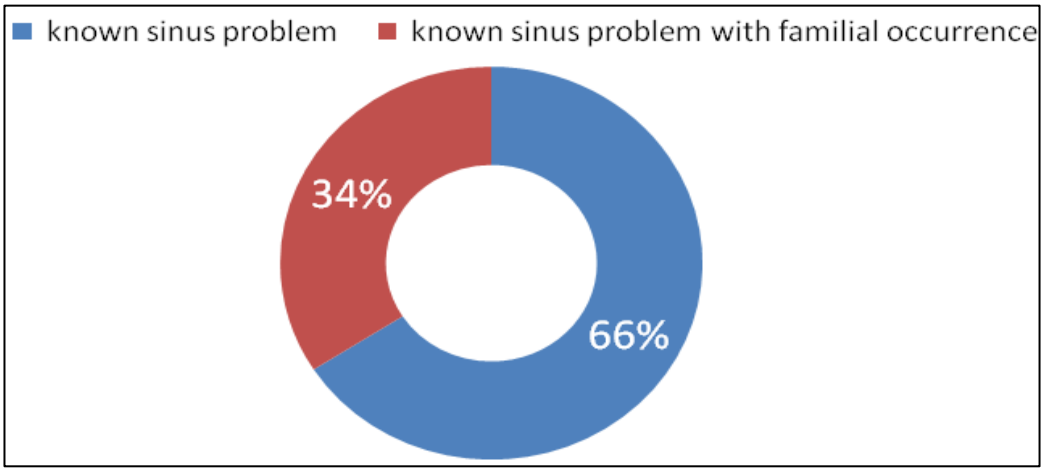


Fig.8: Known sinus problems and its relation with familial incidence

The relation of number of classes taken per day and the rhinitis occurrence is obtained by analyzing the sinus related complaints in teachers taking 1-4 classes, 5-8 classes per day. It is found that 55.60% of

teachers taking 5-8 classes per day develop sinus related complaints than teachers taking 1-4 classes per day with 41.2% which is shown in fig.9.

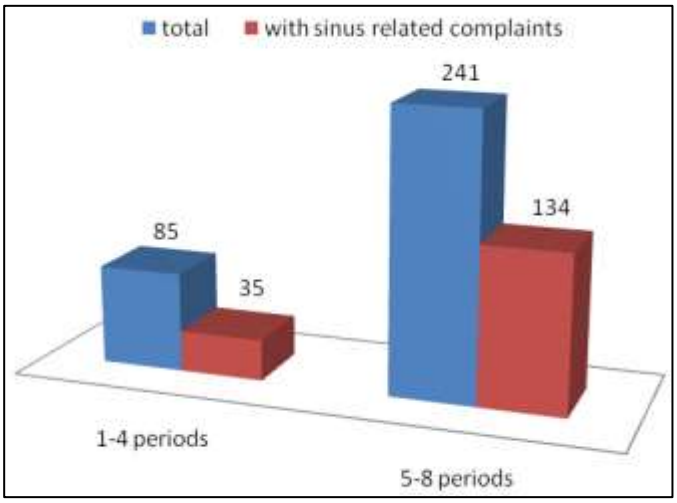


Fig.9. Occurrence of sinus related complaints in teachers taking specific number of classes per day.

Perception of the study is that prolonged exposure of teachers to chalk dust results in the occurrence of rhinitis symptoms and also severed the condition of pre-existing rhinitis in teachers. Since chalk dust is the major pollutant in the class rooms, there is more chance of inhalation of dust during lectures in chalk and talk pedagogy due to their proximity to blackboard. Following the analysis of the samples, there presents majority of samples showing relief during vacation and increase in their symptoms only in their work place (class room, specifically near the blackboard and during lecture hours) which aggravated in evening time. Use of drugs like oral/topical antihistamines and topical steroids cover up the symptoms of rhinitis but the person is constantly sensitized by the harmful substance which was considered harmless initially and thus might result in the airway disease.

IV.DISCUSSION

This study attempted to evaluate the occupational rhinitis in teachers due to prolonged exposure to chalk dust. It is observed that rhinitis symptoms are predominant in teachers who are exposed to chalk dust, including several factors into consideration. A study carried out in 2011, assessed the effect of chalk powder dust on sensitized person based on the dust size and its distribution in the nearness of board. Studies show that anti dust chalk can also produce considerable amount of harmful dust in the classroom environment that paves way to more respiratory disorders in long run.

The present study reveals that the rhinitis symptoms are predominant in middle aged group of teachers with teaching as their lifetime occupation. It also arrives at the result of increase in severity with increased teaching experience due to their exposure to chalk dust in long run. Chalk produces a lot of airborne residue and especially sub-micrometer dust and nano particles that can enter into the respiratory framework. Occupational exposure to dust particle increases the risk of incidence of occupational rhinitis or severing of pre-existing rhinitis. Wearing confront veils for instructors and

keeping a fitting separation from writing slate for understudies amid chalk instructing is exceedingly suggested. In order to provide a complete solution for the occurrence of occupational rhinitis it is suggestive to change the teaching pedagogy from conventional chalk and talk method to modern pedagogy (ICT tools).

V.CONCLUSION

Only infinitesimal data is accessible on chalk dust and its effect on human health and environment contamination. This questionnaire based research on occupational exposure to chalk dust and its effect on human health, the severity of occurrence of rhinitis in sensitized person on exposure duration may guide us to prevent the potential consequences. It is concluded that there is increase in rhinitis occurrence with increase in teaching experience and is predominantly found in teachers above 36 years of age, due to prolonged exposure to chalk dust (in chalk and talk pedagogy). Hence it is needed to shift from traditional and conventional chalk and talk method. In-depth studies involving the familial rhinitis incidence can be conducted on health impact on teachers and children.

VI.ACKNOWLEDGMENT

The researchers sincerely thank the Management, Medical Superintendent, Dean and all the teaching and non-teaching staff of ENT department of Tagore Medical College and Hospital, for their continuous motivation and consistent support to complete this project and expressing their gratefulness to the participated teachers for volunteering in the survey.

Their sincere gratitude to the crew of Indian Council of Medical Research (ICMR) involved in Short Term Studentship, for giving the opportunity and funding for the project.

REFERENCES

[1]. Majumdar, Deepanja,Gajghate, Daulat, Pipalatkar, Pradeep,Chalapati Rao, “Assessment of Airborne Fine Particulate Matter and Particle Size Distribution in Settled Chalk Dust during Writing and Dusting Exercises in a Classroom”, Indoor and Built Environment, 2011, 21, DOI: 10.1177/1420326X11419691.

[2]. Moscato G, Vandenplas O, Van Wijk RG, et al, EAACI position paper on “Occupational Rhinitis”, Journal of Respiratory Research,2009,10(1):16. doi:10.1186/1465-9921-10-16.

[3]. Chi-Chi Lin, Mei-Kuei Lee, Hsiao-Lin Huang, “Effects of Chalk Use on Dust Exposure and Classroom Air Quality”, Journal of Aerosol and Air Quality Research, 2015,pp.2596-2608 .

[4]. Kamini D. Nikam, Munira A. Hirkani, “Effects of Chalk dust on Peak Expiratory Flow Rate in School Teachers”, International Journal of Medical and Health Sciences,2013, pp.407-409.

[5]. Hassan, M.F., “Investigation of Lecturer's Chalk by x-ray Florescence and Fast Neutron Activation Techniques” Proceedings of the eighth Nuclear and Particle Physics Conference (NUPPAC-2011), 2011, (p. 287). Egypt

[6]. Bilge U, Unluoglu I, Son N, Keskin A, Korkut Y, Unalacak M., "Occupational Allergic Diseases in Kitchen and Health Care Workers: An Underestimated Health Issue", BioMed Research International. 2013;2013:285420. doi:10.1155/2013/285420.

[7]. Mirabelli MC, Zock J, Plana E, et al, "Occupational risk factors for asthma among nurses and related healthcare professionals in an international study" Occupational and Environmental Medicine ,2007;64:474-479.

[8]. Siracusa, A. "Epidemiology of occupational rhinitis: prevalence, aetiology and determinants." Clinical & Experimental Allergy (2008): 0954-7894.

[9]. Hox V, Steelant B, Fokkens W, Nemery B, Hellings PW. "Occupational upper airway disease:how work affects the nose", Allergy 2014;69:282-291.

[10]. Friedman-Jimenez G, Harrison D, Luo H. "Occupational asthma and work-exacerbated asthma,doi: 10.1055/s-0035-1550157." Seminars in respiratory and critical care medicine NLSemin Respir Crit Care Med. ISSN:1069-3424 (2015 Jun;36(3):.): 388-407.

[11]. Malo, JL. "Prevalence and intensity of rhinoconjunctivitis in subjects with occupational asthma." European Respiratory Journal (1997): 1513-1515.

[12]. Shaaban, Rafea et al. "Rhinitis and onset of asthma: a longitudinal population-based study." THE LANCET JOURNALS (September 20, 2008): 1049 - 1057.

[13]. Zhao YA1, Shusterman D. "Occupational rhinitis and other work-related upper respiratory tract conditions." Clin Chest Med. (2012 Dec;33(4)): pp:637-47.

[14]. Balmes JR, Speizer FE., "Occupational and environmental lung disease. In: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J (ed.)". Harrison's Principles of Internal Medicine vol. 2. 18th ed. New York: Mc Graw Hill 2012. pp 2121-2129

[15]. Shamssain MH., " Pulmonary function and symptoms in workers exposed to wood dust", Thorax. 1992 Feb;47(2):84-7

[16]. Jai Devi J, Gupta T, Tripathi SN, Ujinwal KK: "Assessment of personal exposure to inhalable indoor and outdoor particulate matter for student residents of an academiccampus (IIT-Kanpur) indoor and outdoor particulate" Inhal Toxicol 2009;21:1208–1222.

[17]. Majumdar D, William SP. "Chalk dustfall during classroom teaching: particle size distribution and morphological characteristics", Environ Monit Asses. 2009;148:343-51.

[18]. José M, Rodilla R, Haar R, Pujadas CS, Zock JP, Clanchet JLD. "Association between occupational exposure to chalk dust and respiratory tract diseases in school teachers" Arch Prev Riesgos Labor 2011; 14 (2): 88-95.

[19]. Bohadana AB, Massin N, Wild P, Berthiot G. "Airflow obstruction in chalkpowder and sugar workers", Int Arch Occup Environ Health. 1996; 68(4):243-248.

[20]. Chan-Yeung M. "Assessment of asthma in the workplace. ACCP consensus statement. American College of Chest Physicians", Chest 1995;108:1084–1117.

[21]. W Stevens, Whitney & Iii, Leslie. (2015). "Occupational Rhinitis: an Update". Current allergy and asthma reports. 15. 487. 10.1007/s11882-014-0487-8.

[22]. Sublett JW, Bernstein DI. “Occupational rhinitis”. Curr Allergy Asthma Reports. 2010;10:99–104.
[23]. Roy-Gerth van Wijk, “Global Atlas of Allergic Rhinitis and Chronic Rhinosinusitis”, pp:108-109.