Effects of Hydrogen Peroxide on the Respiratory System of Dairy Industry Workers

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Abstract

Background and aims: Hydrogen peroxide is antiseptic due to its oxidizing properties and has anti-bacterial, antiviral and antifungal properties. Chronic exposure to this substance causes coughing, shortness of breath, pulmonary edema and bronchitis. Workers that clean the process line in dairy industries, use hydrogen peroxide as a disinfectant in cleaning the production hall. The purpose of this study is to find the level and type of exposure of workers to hydrogen peroxide and the effects that this pollutant has on the respiratory system of workers.

Methods: The study was conducted as case-control in a dairy industry. 10 workers were selected as the case group who are exposed to hydrogen peroxide and 20 workers as control group. Pollutant sampling in the air was done to determine the amount and distribution rate of hydrogen peroxide. The daily exposure time and work experience was recorded. Respiratory and screening tests were performed by a specialist physician, participants with a pulmonary problem were identified.

Results: The case and control groups had an equal mean age and for the case group, the exposure was higher than the safe limit. Using the statistical analysis, the OR value was 2.52 with a confidence interval of 2.12-10.76, the results indicate that hydrogen peroxide exposure, will increase the risk of pulmonary disease.

Conclusion: Occurrence of respiratory symptoms in exposed workers, has increased in control group. Factors such as work experience and smoking, have also been implicated as factors affecting the risk of disease.

Conflicts of interest: None

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INTRODUCTION
Breathing is the most common way that chemicals, especially detergents, enter the body in work places. Most acute and chronic pneumoconiosis can be caused by inhalation of occupational pollutants. Occupational aerosol pollutants, especially gases and chemical vapors, can cause different pulmonary diseases, considering the workers individual differences (1, 2). Chronic and acute poisoning by detergents, is a major problem in developing countries and poisoning with some detergent compounds is more common in these countries compared to the more developed countries (3). The toxic effects of being exposed to detergents, have been studied on various organs. However the major route of exposure to these compounds is the inhalation, it has not been studied comprehensively, and the chronic respiratory effects of occupational exposure to these compounds is understudied. Contradictory results for respiratory effects have been reported (4). Hydrogen peroxide is a toxic and irritating liquid that due to oxidizing, has antiseptic, antiviral and antifungal properties (5). Hydrogen peroxide is used to clean dairy and fruit juice packaging equipment (6). The procedure consist of these equipment being immersed in the hydrogen peroxide. Hydrogen peroxide can stimulate the respiratory system. Repeated exposure to this combination may lead to bronchitis, cough, spu tum and dyspnea. Long-term exposure to these substances sometimes causes discolored patches and burning sensation on skin. Higher concentrations of hydrogen peroxide can cause red rash and blisters. Inhalation of this substance may cause sore throat, abdominal pain, nausea and vomiting (7). Hydrogen peroxide that is released into the environment, initially vaporizes and gradually decomposes into water and oxygen (8). Cleaning workers at the dairy Industry use hydrogen peroxide to clean the salon. Dairy workers have reported occupational disorders such as asthma, chronic obstructive pulmonary disease, hypertensive pneumonia, chronic bronchitis, and cancer (9). There are no comprehensive study on safe exposure and exposure conditions, individual parameters and other confounding factors that show what proportion of exposure can lead to respiratory disorder in exposed workers. The purpose of this study is finding the amount and type of worker’s exposure to hydrogen peroxide, also the long time effect of being exposed to pollutants and the adverse effects it has on the respiratory system of cleaning workers in the dairy industry.

METHODOLOGY:
This study was planned as a case-control study. Statistical population is workers in a dairy factory. 10 workers were considered as case group exposed to hydrogen peroxide and 20 workers as control group. All the sample subjects had a minimum of 4 years work experience in their work places. Exclusion criteria included people with low work experience, smokers, people with respiratory disease, and age less than 30 and more than 50 years. Hydrogen peroxide was sampled by OSHA VI-6 standard methods. In this method the sample is collected using a midget fritted-glass bubbler containing 15mL TiO-SO4. An air sampling pump at flow rate of 1.0 L/min was used. The pump was properly calibrated so that the volume of the air sample, was determined accurately from the flow rate and time. After sampling for analyte extraction, the samples were transferred to the spectrophotometer vials. Using a spectrophotometer, absorption was measured at 410 nm. From the calibration curve obtained from the standard samples, the amount of contaminants in the sampled analytes was determined. Demographic questionnaire was used to collect information such as age, work experience, underlying disease, hereditary disease and smoking. To obtain the disorder of respiratory system a Vitalograph Compact spirometer was used. All subjects were evaluated by spirometric tests under the assistance of a physician. This test determined the respiratory ability of the subjects. The performance of respiratory system was evaluated by pulmonary volumes and capacities were noted according to the physician opinion. The researches performed in this study, determined the lung Force Vital Capacity (FVC) and the Forced Expiratory Vital capacity at the first second (FEV1). The FEV1 / FVC ratio were measured and determined for all subjects in case and control groups. If this ratio was above 75, respiratory function was correct. If the ratio is less than 75 the subject had a respiratory complication. If the ratio was above 75 but FVC was less than 80 % the subject had a respiratory complication. The results of the questionnaire, spirometry and medical examinations were analyzed by statistical tests. Comparisons between means and nonparametric tests were performed to compare the differences between the means of the case and control groups. Odd’s ratio was calculated and analyzed for both
groups, respiratory health and disease in both groups were noted to make sure of the confidence interval results.

RESULTS

The case group’s mean age was 46.6±6.9 and control group 42±5. From the comparison of age mean in two groups with definite variance test, it was concluded that the mean age of both groups was equal (95% confidence). Interfering factors were ineffective according to exclusion criteria, because the underlying and hereditary diseases eliminated in both the case and control groups. By measuring the exposure levels, if the exposure exceeded the 8-hour limit (1ppm), it was identified as an exposed sample, otherwise unexposed. The spirometry test showed that 6 workers out of the case group and 8 workers out of the control group had disorders. The ratio of disordered workers and the workers without any disorders in case and control group was 1.5, 0.67. By statistical analysis and calculating the Odds Ratio, the chances of complication in this workplace due to H2O2 exposure, was 2.25 times greater in exposed workers. According to confidence interval 2.12-10.76 and OR, it could be said that hydrogen peroxide exposure in the studied population, significantly caused respiratory disorders (95% confidence). According to the results of the 4-13 years’ work experience category, the relationship between exposure and respiratory system disorder was significant and strong. In other words, people with less work experience would suffer fewer side effects. In the category of 13-21 years, this relationship was not detected. There was a significant relationship in the age group of 21 to 30 years category, although, due to the extent of the trust gap, this result cannot be generalized to society. There is also a significant relationship between smoking in the studied groups, but due to the wide range of confidence intervals, this result is not generalizable to the society and it can only be used in case group as a positive factor affecting deliberate pulmonary disorder.

DISCUSSION

According to the results of this study, the incidence of restricted respiratory symptoms in exposed workers has increased compared to unexposed workers. Result of this study is similar to other studies which were conducted in the field of chronic respiratory symptoms. The respiratory system is a primary target organism for all inhalable toxins. Accordingly, the function of respiratory system was affected by exposure to hydrogen peroxide by inhalation (10). Long-term exposure to lower levels of pollutants in the workplace may result in chronic disorders such as chronic bronchitis, fibrosis, and lung cancer. Exposure to high concentration of hydrogen peroxide (7 ppm), stimulates the upper respiratory system (11). Other symptoms, such as headaches, nausea and diarrhea have been observed among exposed workers (12). No other respiratory symptoms have been studied on workers in this study. Workers are constantly exposed to higher concentrations of hydrogen peroxide in their workplace. The concentration of other pollutants, has not been the focus of this study, but it could be concluded that exposure to this substance alone in different ways will eventually lead to respiratory disorders. The results also show that workers exposed to hydrogen peroxide are at risk of respiratory disorder. According to the findings of this study, the cause of lung function defects is unclear when exposed to hydrogen peroxide. Different studies have shown that the exposure, increases production of anionic superoxide in pulmonary arteries (13). However, it can partially be stated that the lung diseases are caused by parenchymal lung disease or neuromuscular disorders (14). The workers in this study did not use appropriate personal protective equipment at their work place. Therefore, hydrogen peroxide uptake may have occurred by any of the inhalation, dermal or even oral ingestion pathways, since, the exact role of either of these pathways in respiratory disorder cannot be presented. Considering the presence of smokers in the study, it is not possible to comment correctly on the extent to which each of these variables has an impact on development of pulmonary morbidity. One of the limitations of this study was simultaneous exposure to several factors, such as hydrogen peroxide and smoking in workers, thus, the respiratory disorder deficits cannot be attributed to exposure to one or a combination of several factors. Another limitation of the study was that the respiratory disease in workers diagnosed by spirometry. According to the studies, the last diagnosis of respiratory disorders will be made by plethysmography which was not possible in this study. It was recommended to determine respiratory disorder in exposed workers, that respiratory function tests be performed, especially when workers’ respiratory disorders were increased or when exposed to high concentration contamination. Frequent
exposure may cause bronchitis, which is associated with coughs and sputum. Long-term exposure can cause temporary whitening of the skin and a burning sensation (11). Long-term exposure with lower levels of contaminants in the workplace may lead to chronic disorders such as chronic bronchitis, lung fibrosis, and lung cancer. Also, long-term side effects due to inhalation of toxic contaminants includes bronchiectasis, bronchiolitis, stable asthma, RADS or asthma caused by irritants, allergies and damage to the nervous system. In the study of Mastrangelo et al. titled exposure by hydrogen peroxide, the results showed that exposure to high concentrations, stimulates the upper respiratory system, which is consistent with the results of this study (8). Result of Rada study on exposure to hydrogen peroxide, showed that being exposed with 7ppm concentrations can cause severe lung irritation. Other symptoms such as headache, nausea, diarrhea, etc. have also been reported (12). The results of this study showed that in concentrations less than 7ppm, these side effects have also occurred. It is recommended that the respiratory function tests be performed before the work begins and after a certain period of time, to determine respiratory complications in workers dealing with repeated exposure, especially when workers’ respiratory complaints increases or higher concentrations are reached.

The study did not look at other respiratory symptoms in workers. Exposure of workers in the workshop is continuous and with concentrations higher than the allowed limit. Although the concentration of other contaminants in this plant was not studied in this study, it could be predicted that exposure to this substance alone will lead to pulmonary complications in many different ways. Also, according to the results of the study, it was found that workers exposed to hydrogen peroxide are at higher risk of developing limited lung function. According to the findings of this study, limiting impairments of lung function when exposed to hydrogen peroxide is the main reason that the exposure can affect the respiratory system. In the study of Lisa et al., study of exposure to the inhaled effects of hydrogen peroxide, it was determined that exposure to hydrogen peroxide increases the production of anionic superoxide in the pulmonary vesicles (13). However, to some extent it can be stated that restrictive lung diseases are caused by parenchymal lung diseases or neurological disorders. In Pauluhn study, the effect of being exposed to hydrogen peroxide for 4 weeks, in laboratory rats caused pulmonary complications in the form of 1-2µ lesions (14). Workers participating in this study did not use appropriate personal protective equipment at work. Therefore, the absorption of hydrogen peroxide may have occurred through any of the inhalation, skin, or even oral swallowing, and it is not possible to provide a theoretical function for the role of either of these pathways. Given the inclusion of smokers in the study, it is not possible to properly comment on the extent to which each of these variables contributes to the development of a restricted pulmonary complication. Lisa’s studies have shown that smokers who are also exposed to chemicals have more respiratory symptoms and spirometry disorders than non-smokers (13). One of the limitations of this study was that because there was simultaneous exposure to several factors such as high levels of hydrogen peroxide and smoking in workers, lung defects could not be attributed to exposure to one or a combination of several factors. Another limitation of the study was that the restrictive lung disease in workers was diagnosed by spirometry. According to the sources, the final diagnosis of restricted lung disease will be made by plethysmography, which was not possible in this study.

**KEY WORDS**
Hydrogen peroxide, Occupational disease, Pulmonary disease

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بررسی اثر آب اکسیژنه بر سلامت دستگاه تنفسی کارگران کارخانه لبنیات

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چکیده

آب اکسیژنه به دلیل اکسیدکننده و دارای خصوصیاتی ضدعفونی، ضد ویروسی و ضد قارچی است. مواجهه مزمن با این ماده سبب سرفه، تنگی نفس، ادم ریوی و برونشیت می‌شود. کارگران مسئول نظافت کارخانه لبنیات، هنگام نظافت سالن تولید جهت ضد عفونی کردن سالن از آب اکسیژنه استفاده می‌کنند. هدف از اجرای این طرح پیدا کردن میزان و نوع مواجهه کارگران با آب اکسیژنه و همچنین تاثیر مواجهه طولانی مدت آلاینده و برآمدن عوارض مزمن بر سیستم تنفسی کارگران مسئول نظافت به عنوان افراد مواجه یافته در صنعت لبنیات می‌باشد.

مطالعه به صورت مورد شاهدی با جامعه آماری کارگران یک کارخانه لبنیات انجام شده است. افراد از ۱۵ اکتبر گروه مورد به عنوان کارگرانی که مدتی نخست به مدتی در معرض اکسیژنه هستند و در زمان و شرایط دیگر کارگران با آلاینده ای مواجه نمی‌شوند، به عنوان گروه نظارتی در نظر گرفته شدند.

نتایج نشانگر تاثیر مواجهه بر روی شانس مبتلا شدن به بیماری ریوی می‌باشد. تفاوت معنی‌داری بین میزان میزان آلاینده در جمعیت کارگران و بدون میزان آلاینده بوده است. برونشیت تحسین شده است. نتایج این پژوهش نشان می‌دهد که آب اکسیژنه ممکن است به عنوان که فاکتور پیش‌بینی شده در ریوی مبتلا شدن کارگران در صنعت لبنیات باشد.

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مقدمه
تنفس شیمیدهنده‌های ایندوزنی در محیطهای کار به دلیل ادراک ورود دخورگری از ورود و جذب جذور از این می‌تواند از اهمیت ویژه‌ای برخوردار است. استرس‌برداری‌های شیمیدهنده در محیطهای کار باعث اینکه به صورت آزمایش‌های اپاکلینیک‌کار جهت کشف نارضایتی‌هایهای مصرفی استفاده می‌شود. علاوه بر تربیت‌های حاد و مزمن، روش‌های با توجه به پیگیری آن است که در استنشاق‌های می‌باشد. شیمیایی از بخش‌های تولید کارگران در این حال است. در این وضعيت با انتخاب ممکن است می‌توانند پاسخ‌هایی را که می‌توانند سرده زده داشته‌اند در برابر ازبستگی و گرفتن به‌راک شوند. این امر ممکن است پاسخگویی آن‌ها باشد. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اقدامات در مواجهه با هرگونه می‌تواند بوده است در زمان ماه‌های تولید مورد نیاز. بهترین اق...
بررسی اثر آب اکسیژنه بر سلامت دستگاه تنفسی کارگران کارخانه لبنیات

بر اساس تحقیق‌های قبلی، آب اکسیژنه به عنوان یک اسید و در شرایط مختلف در جامعه انسان، به‌طور مداوم مصرف می‌شود. این سهمیه موجب می‌شود که در حدود ۷۵٪ از افراد، به‌طور مداوم، از این مواد استفاده می‌کنند.

نتایج مطالعه: در مطالعه، نتایج اثر آب اکسیژنه بر سلامت دستگاه تنفسی کارگران کارخانه لبنیات، به‌طور مداوم بررسی شد. نتایج نشان‌داد که این مواد ممکن است اثرات ضار بر سلامت دستگاه تنفسی کارگران را داشته باشد.

مطالعه‌های بیشتری در این زمینه لازم است برگزار شوند تا بتوان در محدوده‌های مختلف این اثرات را بررسی کرد.

Iran Occupational Health. 2021 (01 Jan);18:*.
چشمه رحمی و علی طاهرنیا

وجود نداشته است. این مطالعه سعی بر این بود که انتخاب افراد نمونه به گونه‌ای باشد که در مدت انجام استحاق افراد مورد بررسی (گروه شاهد و گروه مورد) در شغل و محیط کار، به‌طور کلی تا یافتند. با استفاده از میانگین‌ها و از آزمون‌های دیگر، نیاز به ارائه و سلامتی و بیماری هر دو گروه مورد اندازه‌گیری و تحلیل قرار گرفته و به‌طور حصول اطمنان از نتایج قابل اطمینان نیز محاسبه گردیده است.

نتایج

نتایج نشان داد گروه مورد دارای میانگین سنی 64/6 سال و گروه شاهد 32 سال می‌باشد. با انجام آزمون مقایسه میانگین‌های سن دو گروه، با آزمون t، نتایج به این نتیجه خواهد داد که اختلاف میانگین سن دو گروه با اختلاف 95 درصد برای می‌باشد. با توجه به حدف از افراد دارای بیماری زمینه ای می‌توان از مطالعه تعداد بیماری

| H2O2 | 
|---|---|
| مقدار | ساعت مواجهه | محصول
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |
| 7 | 7 | 7 |

جدول 1. نتایج اندازه‌گیری H2O2

| بیمار | موادپذیر | FEV1/FVC% | FEV1 | FVC | سابقه | سن | دید |
|---|---|---|---|---|---|---|---|
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

جدول 2. آلفا، مشخصات و نتایج اسپیرومتری گروه مورد

| بیمار | مقایسه با استاندارد | مقدار | ساعت مواجهه | محصول |
|---|---|---|---|---|
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |
| بیمار | 6 | 6 | 6 | 6 |

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جدول ۳. مراجعه ۲، مشخصات و نتایج آماری مورد بررسی

| موارد | FEV1/FVC% | FEV1 | FVC | سابقه | سال | دیف | روز | شاهد |
|-------|-----------|-------|------|--------|-----|------|-----|-------|
| سال ۱ | ۸۹       | ۸۹   | ۸۹   | ۸۹     | ۸۹  | ۸۹   | ۸۹  | ۸۹ |
| سال ۲ | ۸۹       | ۸۹   | ۸۹   | ۸۹     | ۸۹  | ۸۹   | ۸۹  | ۸۹ |
| سال ۳ | ۸۹       | ۸۹   | ۸۹   | ۸۹     | ۸۹  | ۸۹   | ۸۹  | ۸۹ |

با توجه به گسترده بودن آمده و همچنین محاسبه شده می‌توان با اطمینان ۹۵ درصد تنها گرفته گرفته که مواجهه با H2O2 در افراد جامعه با بوی عارضه روبی تحقیقی از تفاوت معنی‌داری دارد.

با توجه به اینکه در دو گروه دو مانگین سنی برای می‌باشد، فاکتور سی به عوامل داخلی گر از مطالعات حذف گرفته است. در خصوص عامل فاکتورهای موتر بر عارضه روبی تحت مطالعه، بررسی آماری انجام شده و نتایج در جدول ۳ می‌شود. و توجه به نتایج در دسته بندی سابقه ۴ سال رابطه بین مواجهه و عوارض سیستمی متناسب معنی‌دار نیست و به صورت قوت می‌باشد. به عبارت دیگر سابقه بیشتر عوارض کمتری در پی یاده داشته. در دسته بندی سابقه ۲۱ سال این رابطه معنی‌دار نیست و فاکتورهای داده نشده. در دسته بندی سابقه ۲۱ سال رابطه معنی‌دار نیست. این نتایج نشان داد. به دلیل‌هایی از اینکه، این رابطه با عارضه، شاهد نیز در دسته بندی سابقه ۲۱ سال رابطه معنی‌دار نیست. این نتایج نشان داد.

الف (گروه مورد) و ب (گروه شاهد) نمایش داده شده است.

با مشخص شدن افراد گروه‌های مورد و شاهد و همچنین افراد در مواجهه با H2O2 T2 این نتایج و شاهد و مورد مواجهه یافته و بدون مواجهه تعبیه گردیده اند. نتایج تعیین شده در جدول ۳.

نتایج داده شده است.

آنالیز

جست و رپورت تأثیر مواجهه مقدار OR همچنین محاسبه فاصله اعتماد (Confidence Interval)

OR = \frac{6 \times 12}{8 \times 4} = 2.25

با توجه به مقادیر OR شناس ابتلا افراد شاغل در این کارگاه به بوی تصدیق در مواجهه با H2O2 پایین بوده و از این باعث شده که، به عنوان یک راه‌حل برای جلوگیری از تبدیل و یا موارد مواجهه در بوی بررسی تصدیقی هدف‌دهد.

جوه تعمیم این نتیجه به جامعه فاصله اعتماد (dence Interval)

CI = 2.12 - 10.76

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با نتایج این مطالعه می‌باشد (8). در مطالعه را از نشان Dاده شد مواجهه با بر آکسید هیدروژن با غلظت 7 ppm\(^{2}\) می‌تواند بروز تحریک شدید ریوی شود. همچنین علائم دیگری نظیر سر درد، تهوع، اسهال و گزارش شده است\(^{2}(12)\). نتایج این مطالعه نشان داده است که میزان همکاری 5% از حذف شده اند.

بحث

با توجه به نتایج به دست آمده در این مطالعه بررسی اکسید هیدروژن با کمک تحقیقات مختلف کارگران پیش‌نشان یافته و با تأثیر با توجه به سایه‌های مصرف مواد می‌تواند به دسترس باشد.

جدول 4. نتایج به دست آمده در این مطالعه

| گروه‌بندی | شرایط | موارد | شاهد | مواجهه | منفی
|-----------|-------|-------|-------|----------------|------|
| 0/1-0/2/9 | 123   | 8     | 7     | 1             | 1    |
| 0/3-0/4/5 | 234   | 3     | 1     | 3             | 2    |
| 0/6-0/8/9 | 237   | 0     | 0     | 0             | 0    |
| 0/10-1/2/0| 120   | 7     | 1     | 1             | 1    |

میزان همکاری 5% از حذف شده اند.

گستره وسیع فاصله اعتماد، این نتیجه قابل تعمیم به جامعه نمی‌شناسد و در جامعه مورد مطالعه سیگار به عنوان یک عامل تأثیرگذار مبتلا در ایجاد عارضه ریوی تحقیقی دخالت داشته است. در خصوص بیماران زنی می‌توان به دلیل نمایش موارد از مطالعه حذف شده اند.

هفته‌ای که باغ‌رهی در شرایط و GitHub و سایت‌های مختلف توجه به شدت شدید این نکته در نظر گرفت. همچنین کارگران پیش‌نشان یافته و با توجه به سایه‌های مصرف مواد می‌تواند به دسترس باشد.

۱۰ Iran Occupational Health. 2021 (01 Jan):18; *.

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بررسی اثر آب اکسیژنه بر سلامت دستگاه تنفسی کارگران کارخانه لبنیات

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