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ACHOO or Covid-19? What an Instagram-based Study can Reveal

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Abstract

Aims: Sudden exposure to bright light (ACHOO syndrome) could be a bizarre reason for a sneeze. Sneezing due to the explosive exhalation of potentially pathogenic droplets is an immediate danger for SARS CoV-2 contagion. This article highlights the insidious phenomenon of the photic sneeze reflex and points out the social effect of sneezing in the middle of the pandemic.

Methods: We created an Instagram account, called photicsneezereflex, to educate our followers and derive our statistics. We set, via Instagram stories, the following questions: 1) How much will you be bothered by someone who is sneezing near to you?, 2) How possible could it be to consider him/her a SARS CoV-2 carrier?, 3) How possible could it be to consider him/her a photic sneezer? The answers were scaled on a 1 to 5 climate, and a descriptive statistical analysis was carried out.

Results: For the first question, merely 25% scaled their annoyance with a score lower than three, while the median rating was 4 (mean= 3.7, SD= 1.26). Question two showed the most fluctuated results, with a median score of 3 (mean= 3, SD= 1.35). Finally, the median score for the possibility of photic sneezing was 2, with a mean=2.26 and an SD= 1.22.

Conclusions: This report primarily aims to promote that a pure habit could become very threatening for a society during a pandemic. Spreading coronaviruses widely, engendering confusion and fear, and causing frustration are only some deleterious side effects for public health and society.

Introduction

Historically, sneezing was associated with longevity, and still, in many cultures, it is followed by wishes for well-being. There are plenty of irritants that can cause this autonomic reflex. Usually, a sneeze is caused by foreign particles irritating the nasal mucosa. Moreover, it can also be linked to a sudden fall in temperature, an aura of cold air, a full stomach (Gustatory rhinitis), or viral infection. Sudden exposure to bright light could be another reason for a sneeze, which we scientifically call ACHOO (Autosomal Dominant Compelling Helioophthalmic Outburst) syndrome. However, nowadays, the connection between sneezing and health is controversial due to the Covid-19 pandemic. The explosive exhalation of potentially pathogenic droplets is an immediate danger for SARS CoV-2 contagion. This article highlights the insidious phenomenon of photic sneeze reflex and points out the social effect of sneezing in the middle of the pandemic.

Methods

The difficulties of carrying a survey during a pandemic, especially when we had to estimate sneezing, made us creative. Firstly, our purpose was to educate people directly, using photos and videos, about ACHOO syndrome. To assess the syndrome, we utilize social media's power by setting up an Instagram profile entitled "photicsneezereflex", both in Greek and English. After that, we tried to assess the syndrome's incidence and its characteristic in each individual. However, the primary purpose of this project was to evaluate

if the knowledge of sun-related sneezing could make a sneeze socially accepted during the Covid-19 pandemic. To figure out this, we asked, via Instagram stories, the following questions:

1. How much will you be bothered by someone who is sneezing near to you?
2. How possible could it be to consider him/her a SARS CoV-2 carrier?
3. How possible could it be to consider him/her a photic sneezer?

The questionnaire was standardized, and the answers were rated on a 5-point scale ranging from 1 for minor to 5 for the utmost outcome. After adequate information, the questionnaire was completed, and data analysis was performed on an anonymous basis character. Descriptive statistical analysis was then carried out. We did not collect any personal or demographic information from neither of the participants. No approval by the Ethics Committee was necessary.

Results

Eighty followers of a total of one hundred fifteen-teen (69.5% participation) voluntarily answered all the questions. Regarding the magnitude of bothering by a sneeze near to them, participants overwhelmingly expressed their annoyance. Specifically, 52 out of 80 participants scored 4 or 5, giving, in general, a median rating of 4 (mean= 3.7, SD= 1.26). Merely 25% scaled their annoyance with a score lower than three (P25=3). The second question showed the most fluctuated results, with a median score of 3 (mean= 3, SD= 1.35). Sixty participants scored at least two, but only 25% of the results were at the larger scale of 4 or 5. Almost all respondents (70/80) considered it extremely unlikely to sneeze to be aroused by the light exhibition, scoring 1 to 3. The median score for the possibility of a photic sneezing was 2, with a mean= 2.26 and an SD= 1.22. Figure below depicts the analytic results of each question, and table 1 summarizes the statistical outcome.

Discussion

The results demonstrate that in the middle of the COVID-19 pandemic, a sneeze could not be socially accepted under the suspicion of contagion. However, on the contrary, the chances to consider each sneeze as a COVID-19 symptom fluctuate. Finally, even though our profile presented enough interactive education materials, the participants could not easily connect sneezing with ACHOO syndrome.

The respiratory droplets are the main path of SARS-CoV-2 transmission. Therefore, sunny sneezing could be an underestimated route of contamination, notably in asymptomatic patients. On the contrary, it is crucial to point out the social criticism when somebody sneezes due to light exposure without being a SARS-CoV-2 carrier. The overlapping symptoms of these two completely distinct entities could be a deliberating reason for quarrels and confusion. Overall, social distancing has been demonstrated as the most efficient measure for containment in the community [1]. Other measures like masks, frequent hand washing, and tissue or elbow as sneeze protectors have a vital role in pandemic restriction.

Autosomal Dominant Compelling Helioophthalmic Outburst Syndrome or simplest photic sneeze reflex is a genetic condition in which an affected individual uncontrollably sneezes when looking at a bright, intense light, most often sunlight. The sun-related reflex was firstly mentioned by ancient Greek philosopher Aristotle and described in the medical literature by Sedan in 1954. Less is fully understood about this unique characteristic, but approximately 18-35% of Americans are affected by this syndrome [2]. ACHOO syndrome has an autosomal dominant pattern of inheritance [3]; therefore, an affected parent gives a 50% chance of inheriting the syndrome to his/her child. Other studies found that females are photic sneezers in 67%, and 94% of the sneezers are Caucasians. Nicholas Eriksson et al. identified two novel SNPs that were connected with ACHOO. The two SNPs, rs10427255 and rs11856995, lay in large intergenic regions of 2q22.3 and 15q26.2, respectively [4]. As of date, the photic sneeze reflex is considered mainly an innocent, clinically diagnosed entity, and maybe this is why much research has not yet been conducted on it. The normal sneezing reflex may be divided into two phases. Firstly, the nasal phase, following chemical or physical irritation of the intranasal mucosa. The olfactory and ethmoidal nerves are the afferent branches through which signals deliver to the medulla's center of a sneeze. The second phase, or the

efferent, begins after activating a specific number of inspiratory and expiratory neurons. After that, preganglionic fibers via the superficial petrosal and sphenopalatine ganglion enhance trigeminal stimulation. The putative center of the sneeze is bilaterally adjacent to the spinal trigeminal nucleus and tract, appearing with functional independence on both sides. Neuroimaging studies indicate that the "sneeze center" is located proximal to the subnucleus caudalis and subnucleus interpolaris of the trigeminal spinal nucleus [5]. The lateral medullary syndrome usually leads to difficulty in sneezing. The affected one feels an itch and a need to sneeze but cannot reproduce the reflex. The reflex can be triggered only after the first exposure to light. No clear research evidence connects ACHOO with a specific pathophysiological pathway. For example, Eckhardt et al. [6] suggested that stimulation of the optic nerve triggers the trigeminal nerve. According to this theory, an indirect signal is transferred to the ophthalmic branch of the trigeminal nerve. In this way, the maxillary division of the trigeminal nerve is affected, generating the nasal stimulation that will cause the sneeze. The parasympathetic generalization suggested by Watson is another dominant theory. According to it, the stimulation of one branch of the parasympathetic plexus tends to activate other branches. There is a possibility that sensory input from the eyes could travel to the cortex's neurons that interpret such signals. Neighboring neurons that are involved in sneezing are also activated due to the generalization [7].

The photic sneeze reflex is vital for animals, whose smell sensation is an evolutionary survival weapon and can be used to clean the nasal cavity. The reflex may also benefit human beings, especially newborns, who are considered obligatory nasal breathers. Infants have no other way to wash out their nasal cavities. Sneezing is a dangerous reflex for multiple reasons; however, it is hugely contraindicated trying to hold in a forceful sneeze. Any effort to suppress a sneeze can be deleterious. The willing closure of the oral and nasal cavity increases over 20 times the airway tract pressure and results in six different categories of sneeze-related trauma. These are intracranial injury (pneumocephalus, CSF leak), ocular/orbital (orbital emphysema, retrobulbar hematoma), otologic (round window fistula, sensorineural hearing loss), intrathoracic (pneumothorax, aortic dissection), and laryngeal/pharyngeal (vocal cord hematoma, thyroid fracture) [8]. The sudden sneeze of an ACHOO-affected individual can especially cause accidents to a car, motorcycle, or even airplane driver and elevate the risk of some health consequences. People affected by ACHOO and allergic rhinitis were found to be helped when treated with antihistamines. Conservative measures such as hats, scarves, sunglasses, or transverse digital pressure on the philtrum were also found adequately efficient.

Conclusions

This report primarily aims to promote that a pure habit could become very threatening for public health by spreading coronaviruses widely and engender confusion and fear when similar pandemics occur. Besides that, the sneeze reflex can cause frustration during a period where public health issues have arisen. We decided to utilize social media to educate our followers about ACHOO syndrome and create our sample data. Interestingly, the participants were encountered entirely voluntarily in the survey, and the questionnaire's structure was found relatively easy and pleasant. Considering the power of social media in modern life, we suppose that other future studies could be based on them. In such conditions, researchers could reap the benefits of familiarization, accessibility, and rapidity to increase and facilitate participation in several scientific studies. Nevertheless, we have to indicate the limitations of a similar approach, such as the inability to examine patients. The little that is known about ACHOO creates a necessity for novel research projects. The discovery of a specific gene and the exact mechanism of reflex has yet to be found. Our future scientific goal is to calculate its incidence in the Greek population and recognize its features in the children population.

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