The Effect of Heat on Eye in Bakery Workers

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Abstract

The impact of heat on the eye can lead to potential risks to ocular structures and visual function. Prolonged or intense heat exposure can lead to various ocular manifestations. Dry Eye Syndrome is a common consequence, attributed to increased tear evaporation and resulting in symptoms such as redness, irritation, and blurred vision. The aims of study to evaluate the effect of heat on the eyes of workers and people who use thermal bakeries while working on them during the day and to know the surrounding factors in the workplace and their effect on the eyes. This study was conducted at Baghdad (Mahmoudia Hospital) including some rural areas such as Yusufiya for six months from 1/December/2022 to 1/June/2023 for 100 patients (70) males and (30) females between 15-45 years of age. A questionnaire was made for the demographic data, symptoms, refractive errors, period of exposure and were examined by several visual instruments such as Snellen chart and retinoscope. Among the most important problems they suffer from: headach and dry eye. The percentage of their problems varied from mild to severe, depending on the severity of symptoms (period of exposure to heat) and age. Treatment began to reduce the effect of exposure to heat. And also by giving them moisturizing drops under the supervision of a doctor.

Keywords: *Heat, Bakery, Conjunctivitis, Dry eye, Pterygium, Photophobia.*

تأثير وتقييم الحرارة على عيون عمال الافران

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الخلاصة

يمكن أن يؤدي تأثير الحرارة على العين إلى مخاطر كبيرة على الاجزاء العينية والوظيفة البصرية. يمكن أن يؤدي التعرض للحرارة المطولة أو الشديدة إلى مظاهر بصرية مختلفة. متلازمة جفاف العين هي نتيجة شائعة، تُعزى إلى زيادة تبخر الدموع وتؤدي إلى أعراض مثل الاحمرار والتهيج وعدم وضوح الرؤية. تهدف الدراسة إلى تقييم تأثير الحرارة على عيون عمال الفرن والأشخاص الذين يستخدمون المخابز الحرارية أثناء العمل عليها أثناء النهار ومعرفة العوامل المحيطة في مكان العمل وتأثيرها على العيون.

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اجريت الدراسة في بغداد (المحمودية) وبعض المناطق الريفية مثل اليوسفية .اشتملت الدراسة 100 مريض تم تصنيفهم على 70 ذكر و30 أنثى تتراوح أعمارهم بين 15 و45 سنة .تم اجراء استبيان للحصول على معلومات المرضى (العمر والجنس)، الاعراض، الاخطاء الانكسارية وفترة التعرض الى الحرارة و تم فحصهم باستعمال العديد من الاجهزة البصرية مثل لوحة سنيلن والرتنوسكوب . من أهم المشاكل التي كانت شائعة بين عينة الدراسة: الصداع وجفاف العين. تفاوتت نسبة المشاكل لديهم من خفيفة إلى شديدة، اعتمادًا على شدة الأعراض (فترة التعرض للحرارة) والعمر. بدأ العلاج في التقليل من تأثير التعرض للحرارة، وأيضا من خلال اعطائهم قطرات الترطيب تحت اشراف الطبيب.

الكلمات المفتاحية: *حرارة، افران، التهاب الملتحمة، جفاف العين، الحساسية من الضوء.*

1.1 Introduction

According to epidemiological studies, the period of exposure to heat in bakeries can affect the amount of damage of the eye lens. Consequently, there is a connection between cataracts and environments with high temperatures [1].

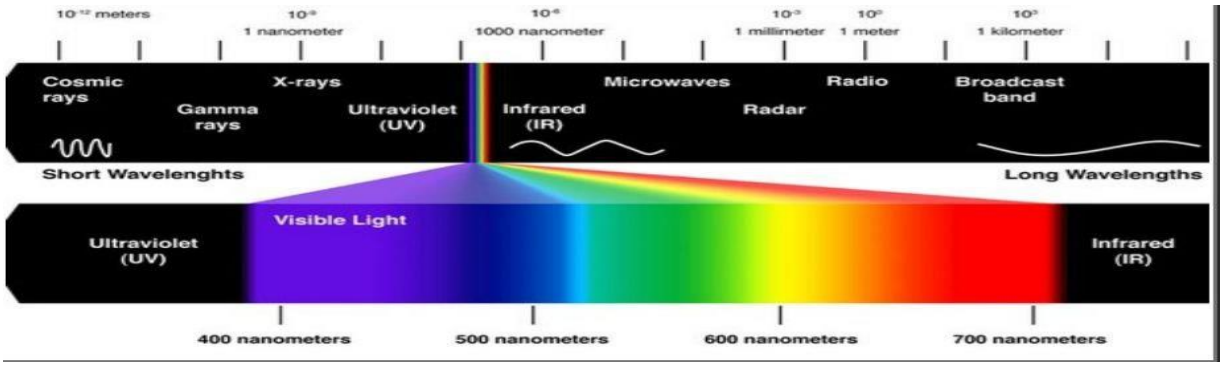

Fig. (1): Electromagnetic field.

Working in places where the temperature is too high has raised concerns about occupational heat exposure worldwide [2]. The Occupational Health and Safety Administration has classified some indoor work environments, such as bakeries, homes with bread ovens, and furnaces, as being particularly susceptible to heat-related disorders [3]. When the body temperature rises due to heat stress, it causes symptoms like dry skin, chills, high body temperature, dizziness, confusion, fainting, exhaustion, nausea, weakness, and muscle cramps [4& 6]. High-temperature baking the dough into a loaf could result in smoke being released from the loaf, which could hurt the eyes [7]. If workers are unaware of heat-related illnesses and how to prevent them, the consequences of humid and heat working conditions may increase. Environmental pollution causes numerous issues and can seriously harm the human eyes [8].

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Because of the negative effects of many environmental factors, including heat, on human body parts and the eye, the eyes are also vulnerable and easily harmed. The retina is one of many various types of tissue that make up the eye. Some of these tissues are more sensitive than others; hence they are located deeper in the eye. Because the eye is a light-sensitive organ, the environment has a significant impact on its performance [9]. The ability to see in three dimensions and see color in natural light is the eye's most crucial job. Numerous eye disorders, including conjunctivitis, and dry eye, are caused by environmental factors such as pollutants, temperature changes, variable humidity, UV, bacteria, smoking, various drugs, and cosmetics [10].

Fig. (2): Conjunctivitis.

Human vision is impacted by electromagnetic radiation in the workplace [11]. Light electromagnetic spectrum the claimed that UV radiation and internal oven warming were the two main causes of human blindness, with global warming playing a significant role in cataract development and progression. While acute keratitis, climatic droplet keratopathy, conjunctivitis, pterygium diseases and trachoma are all caused by an increase in ultraviolet light as a result of the loss of ozone in the atmosphere [12].

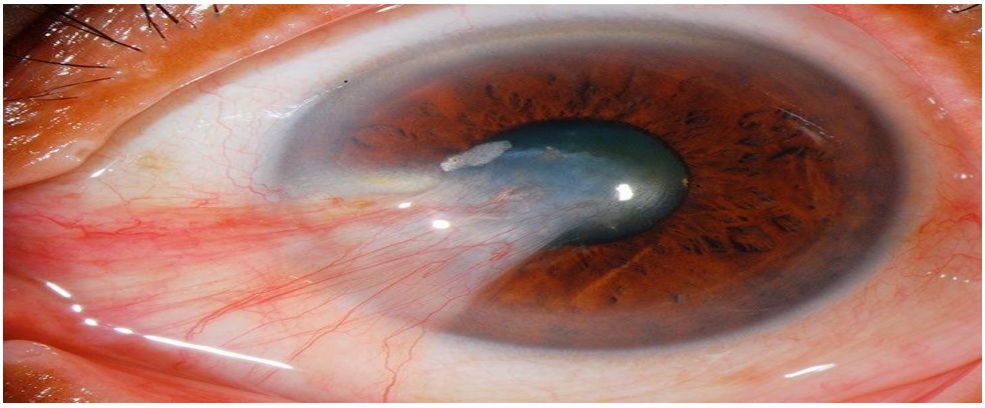

Fig. (3): Pterygium.

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Additionally, if heat exposure is not properly controlled, it jobs performed in bakeries expose employees to high amounts of heat that might have an adverse effect on their health [13]. It's probable that prolonged exposure to heat while baking at home leads to cataracts, which is caused by the thermal kitchen's cooking procedure [14]. Industrial bakeries and traditional bakeries are the two types of bakeries. When conducting the investigation and visiting both types of bakeries, the oven worker in traditional bakeries was shown to be more exposed to heat than an industrial worker because the traditional worker does not work in a setting that is as conducive to health as an industrial bakery [15].

2.1 Material and Methods

The study was conducted on a group of 100 patients (70 males and 30 females). Their ages ranged between 15 and 45 years, to know the effect of the duration of exposure to heat on their eyes, as bakery workers were examined when direct contact with heat in ovens, in private eye clinics, Mahmoudia General Hospital and health centers. This study examined 6 months for December 1, 2022 to June 1, 2023. The first step was to collect patient history data by filling in a questionnaire sheet. There are several devices to check for refractive error. Cases were examined using a Snellen chart Graphic of visual acuity and examination of the anterior chamber with a slit lamp and with fluorescent dyes for desiccation and crusts. Intraocular pressure measurement, and are used

2.2 Equipments:

1. Retinoscope: For refraction of the eye and prescription evaluation

Fig. (4): Retinoscope.

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2. Trial case: For corrective for any type of the refractive error.

Fig. (5): Trial case.

3. Results and Discussion

The data have been analyzed and organized statistically by (One sample t-test and chi-square) after categorizing the cases into six distinct age groups.

Table (1): the demographic description of study sample (age and gender).

Age(years)	Gender		Total
	Female	Male	
(15-20)	2	2	4
(21-25)	12	20	32
(26-30)	2	12	14
(31-35)	6	16	22
(36-40)	5	18	23
(41-45)	3	2	5
Total	30	70	100

Table (1) Demographic description of the study (age and gender) 100 patients included/ 70 males and / 30 females divided into six groups of samples between (15-20) years percentage 4 % with 2 males and 2 females, (21-25) years percentage is 32% with 20 males and 12 females, (26-30) years the percentage is 14% with 12 males and 2 females, (31-35) years in percentage 22% 16 male and 6 ffemale (36-40) years percentage is 23% with 18 male and 5 female and the last group of age (41-45) years in percentage 5% with 2 male and 3 female.

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Table (2): the relationships between age and time of heat exposure.

Age (years)	Time of heat exposure			
	1-5 hours	6-10 hours	More than 11 hours	Total
(15-20)	2	1	1	4
(21-25)	14	10	8	32
(26-30)	2	7	5	14
(31-35)	0	15	7	22
(36-40)	4	8	11	23
(41-45)	2	2	1	5
Total	24	43	33	100

Table (2) shows that 8.35% who was exposed for (1-5) hours daily was between age (15-20) years while those who was exposed more than 11 hours daily for that age was 3.03%, 58.3% who was exposed for (6-10) hours daily between (25-21) years and 33.3% who was exposed for more than 11 hours daily was (36-40) age .

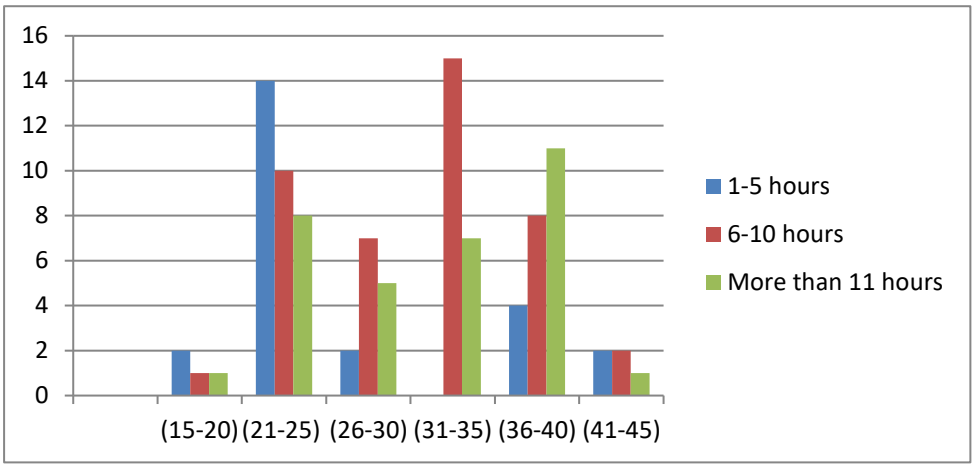

Fig. (2): the relationships between age and time of heat exposure.

Table (3): the relation between age (years) and complications of heat exposure.

Age (years)	Dry eye			Conjuctivitis			Pterygium			Photophopia		
	Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
(15-20)	2	2	4	2	2	4	0	4	4	0	4	4
(21-25)	13	19	32	16	16	32	13	19	32	1	31	32
(26-30)	6	12	18	7	7	14	4	10	14	4	10	14
(31-35)	5	15	17	10	12	22	9	13	22	6	16	22
(36-40)	11	12	23	10	13	23	5	18	23	4	19	23
(41-45)	3	0	5	2	3	5	1	4	5	2	3	5
Total	40	60	100	47	53	100	32	68	100	17	83	100

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Table (3) illustrates the relation between age (years) and complication of heat exposure. It shows the highest incidence rate of dry eye at age (21-25) and the lowest incidence rate at age (15-20), the highest incidence rate of conjunctivitis is at age (21-25) and the lowest incidence rate is at age (15-20), the highest incidence rate of pterygium is at age (21-25) and the lowest incidence rate is at age (41-25) and the highest incidence rate of photophobia is at age (21-25) and the lowest incidence rate is at age group (41-45).

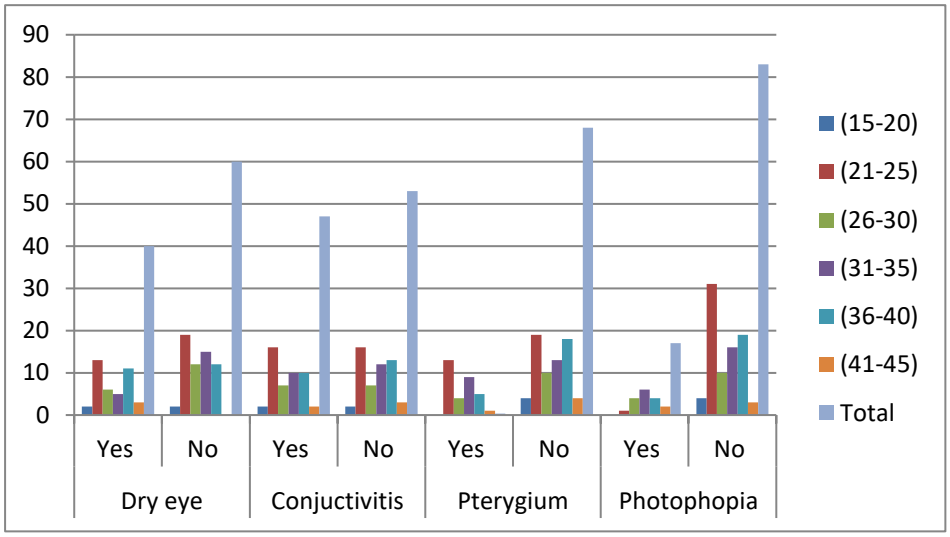

Fig. (3): the relation between age (years) and complications of heat exposure.

Conclusions

Most cases were males because rural areas men are accepted to work in a bakery, while females rarely work. Age (21-25) years are the most backery workers age in our study as those always search for economic factors. Age in between (15-20) years are always students so they the lowest shifts than ouers. Most of the workers have redness and conjunctivitis with lacrimation especially with age around (21-25).

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