

## Dry Eye Syndrome Secondary to Kohl (Eyepencil)

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### Authors' contributions

*This work was carried out in collaboration among all authors. Author AR designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author AR managed the literature searches. All authors read and approved the final manuscript.*

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### ABSTRACT

Dry eyes are becoming a part of people's lives more and more frequently. Usage of eye cosmetics is known to cause disturbances in the stability of tear film and cause dry eye symptoms we conducted a prospective study on a sample of 100 women whose age ranged from 18 to 35 years in university hospital center MOHAMMED VI Oujda MOROCCO on a period of 6 months from January 2019 to JUNE 2019. The aim of this study is to determine the effect of applying Kajal (an eyecosmetic) over the eyelids on tear film stability and quantity.

*Keywords: Dry eye syndrome; pencil eye; kajal.*

### 1. INTRODUCTION

Application of eyepencil (Kohl) as an eye cosmetic is a popular practice among women in Africa.

The use of Kohl has been reported since antiquity and is worn for a variety of reasons

including religious beliefs, tradition, medicinal benefits; but most importantly as a cosmetic.

Kohl is defined as an eye preparation in ultra-fine form of specially processed "kohl stone" (galena) incorporated with other therapeutically active ingredients from marine, mineral and herbal origin and is applied along the upper and

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lower eyelid margins [1,2]. Stable tear film over the cornea is very important to maintain a uniform refracting surface and for comfort in the eye [3]. Usage of eye cosmetics is known to cause disturbances in the stability of the tear film and cause dry eye symptoms. Application of Kohl over the eyelid margin blocks Meibomian gland orifices and can potentially affect the lipid layer of tear film which in turn may affect tear film stability.

### 1.1 Aim

This study was done to determine the effect of applying Kajal along the eyelid margins on the tear film quantity and stability.

## 2. MATERIALS AND METHODS

We conducted a prospective study on one hundred women whose ages ranged from 18 to 35 years at the University Hospital Center MOHAMMED VI OUJDA MOROCCO over a period of 6 months (January to JUNE 2019).

The ocular surface was evaluated with fluorescein for tear film rupture time, corneal sensitivity and Schirmer II test.

Subjects who used kohl for at least 5 days a week on upper and lower eyelid margins and had been applying it for at least 6 months were defined as Kohl users.

Patients with any of the following conditions were excluded from the study:

- an systemic ophthalmological disease (dysfunction of meibomian glands, dryness, ocular allergy).
- wearing contact lenses.
- history of use of any medication.
- refractive errors or smokers.

## 3. RESULTS

Mean age of the participants was 25 years with a range of 18 to 35 years.

Kohl wearers applied that for cosmetic purposes and the mean duration of use was 5 years.

The results of tear break up time (TBUT), fluorescein test and slit lamp examination were as follows:

90% of participants had an abnormal TBUT,

30% of participants had superficial punctate keratitis,

And slit lamp examination founds 2 cases of corneal dystrophy secondary to the application of kohl.

### Shirmer test:

In our series was normal in 90% of our patients with an average of 13 mm / 5 minutes.

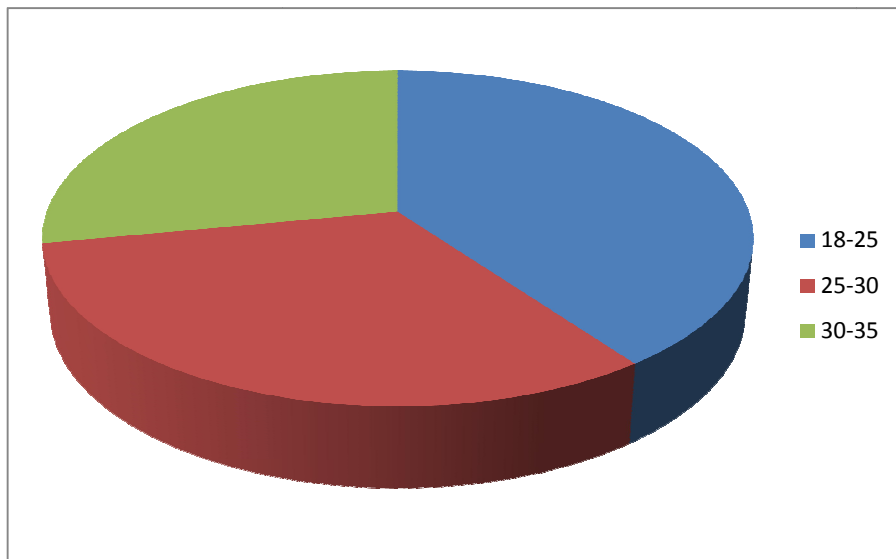
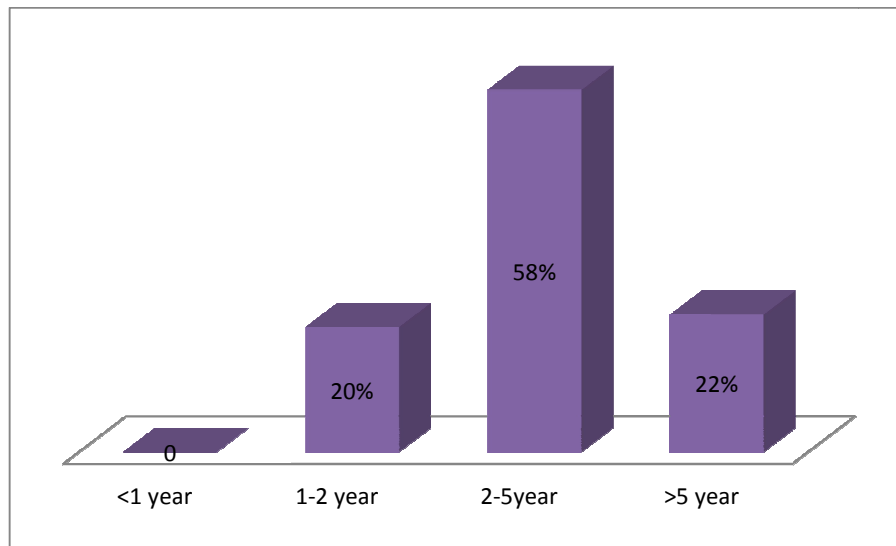
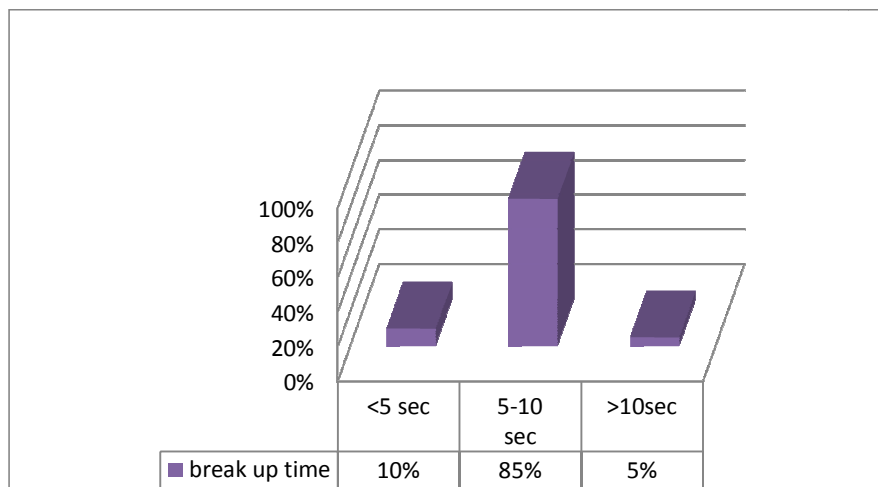


Fig. 1. Distribution according to age



**Fig. 2. The duration of application**



**Fig. 3. Break up time**

#### 4. DISCUSSION

Dry eye disease is becoming a part of people's lives more and more. The prevalence has been shown to be greater in women in epidemiological studies, potentially or partly due to increased cosmetic use among female population [1,2].

A relatively thinner tear lipid layer secreted by tarsal Meibomian glands spread over the ocular surface by blinking mechanism protects the tear film from evaporation. Disturbances to the tear film lipid layer like thinning and non-uniformity is known to affect tear film stability. Use of ocular lubricants, cosmetics and contact lenses are

among the factors that are known to decrease the stability of tear film [3].

A study published by scientists at the University of Waterloo was first to officially show that make up migration happened quicker and was greater when eyeliner was put on the inner lid margin. They found that within five minutes, 15-30 percent more particles moved into the eye's tear film when subjects applied eyeliner to the inside of the lash line, compared to outside it. The makeup also moved more quickly into the eye when eyeliner was applied inside the lash line. This contamination in turn causes a faster destruction of lipid layer and reduces the capability of lipid to spread.

Kohl is usually applied along the upper and lower lid margins which causes the cosmetic articles to spread over the Meibomian gland openings and causes obstruction to the Meibomian gland orifices and contaminates its secretion [4].

Radhika et al. [5] established a study in which they examined the tear film clinical characteristics on two groups of subjects; those who used Kajal as an eye cosmetic and those who did not. The results demonstrated that mean non-invasive tear break-up time (NIBUT) among Kajal wearers were significantly lower than those who did not apply it.

## 5. CONCLUSION

An understanding of the ocular effects of eye cosmetic wear and the efficacy of potential treatments is required to inform clinical advice and management. Our study demonstrates that application of Kohl as cosmetic over the eyelid margins can cause eye dry by reducing the tear film stability.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

As per international standard or university standard ethical approval has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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