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**Opthalmic Drug Abuse: Knowledge, attitude and Practice (KAP) among Ophthalmologists.**

# Ophthalmic Drug Abuse: Knowledge, Attitude and Practice of Ophthalmologists in Jordan


## Abstract

This study was conducted to provide a background regarding knowledge, attitude and practice (KAP) of ophthalmologists in Jordan regarding ophthalmic products abuse and misuse. A cross-sectional self-reported survey was conducted among a sample of ophthalmologists of all ranks who were working at different hospitals, centers and clinics in Jordan. A total of 137 valid questionnaires were returned (response rate = 69.1%). The majority of respondents were male (73.7%) and between 20 and 40 years old. Only 47.4% of our sample knew the correct difference between the definitions "abuse" and "misuse". The majority of participating ophthalmologists (87.6%) reported that ophthalmic drugs were liable to abuse. Ophthalmologists 40 years or younger had more knowledge about ophthalmic products abuse than their older counterparts ($p<0.05$). Most ophthalmologists (67.2%) reported Pentolate® eye drop (Cyclopentolate) as the top ophthalmic product liable to abuse. This study provided, for the first time, background regarding the knowledge, attitude and practice of ophthalmologists about this relatively uncommon and alerting type of drug abuse. Moreover, it highlighted the importance of increasing awareness of ophthalmologists and community pharmacists who dispense such drugs about the issue.



## KEYWORDS

Abuse; Jordan; Misuse; Ophthalmologists; Ophthalmic drugs; Over-The-Counter

## Introduction

Abuse of over- the counter (OTC) or prescription medications is an international issue. OTC medications are those that could be obtained from pharmacies or other retail outlets without a prescription (Lessenger & Feinberg 2008). Although the sale of OTC drugs from community pharmacies may comfort patients to self-treat minor ailments, save effort and time of patients and physicians, some of these medicines can be abused and therefore lead to addiction (Cooper 2013).

Misuse is a broad term which involves many different forms of problematic consumption (Casati et al. 2012) and by definition, any medication can be misused, but only few have the abuse potential, such as those with mind-altering or body-shaping properties (Hughes et al. 1999). The most commonly abused OTC drugs are opioid- containing medications that can be obtained in limited doses in certain countries (e.g. UK) without a prescription, cough and cold remedies containing first generation antihistamines (e.g.diphenhydramine, chlopheniramine), sympathomimetics (e.g. pseudoephedrine) and dextromethorphan (Cooper 2013). Where the most commonly reported prescription medications to be abused are central nervous system (CNS) depressants such as sedatives (benzodiazepines) or some -anticonvulsants like clonazepam and stimulants such as methylphenidate (NIDA 2014).

In Jordan, with the exception of controlled drugs, you can obtain any drug without a prescription. This availability combined with accessibility of pharmacies and relatively low price products may lead to abuse of different and more kinds of prescription and OTC drugs (Albsoul-Younes et al. 2010). There has been a trend in the past five years in Jordan for ophthalmic drugs to be abused (i.e. - used to experience mental altering effects), many of which are obtained from

pharmacies without a prescription. The most commonly reported ophthalmic preparations are those containing anticholinergics, antihistamines and/or decongestants such as cyclopentolate, naphazoline, and antazoline (Wazaify et al. 2017; Al-Khalaileh et al. 2018; Al-Khalaileh et al. 2019).

Ophthalmic anticholinergic preparations (e.g. cyclopentolate, tropicamide) are widely used to induce mydriasis and/or cycloplegia during eye examination (Trevor et al. 2010). The abuse of these drugs became popular especially in the eighties in response to their effect in causing euphoria and hallucination. The main reported reasons for abuse were reported to be: relaxing, increase in pleasure, getting high, increase in energy, and a decrease in depression (Darcin et al. 2011; Bersani et al. 2013; Bersani et al. 2015).

Many other types of ophthalmic drugs were reported in literature to be liable for abuse as topical anesthetic drugs (TADs) (Erdem et al. 2013; Sharifi et al. 2013; Al-Khalaileh et al. 2018), topical ophthalmic decongestants (Balbani et al. 2000; Al-Khalaileh et al. 2018), and topically applied Non-steroidal Anti-Inflammatory Drugs (NSAIDs) (Flach 2001; Flach 2006; Al-Khalaileh et al. 2018).

To date, there have been two studies, which investigated ophthalmic drug abuse in Jordan. The first one from the perspective of community pharmacists using a self-reported survey (Wazaify et al. 2017), and the second one was an observational study aimed to observe the requests of ophthalmic products and evaluate the most popular and frequently requested ophthalmic drugs suspected of abuse in community pharmacies in Amman, the capital of Jordan (Al-Khalaileh et al. 2019). Since the problem has been discussed from pharmacists` perspectives (Wazaify et al.

2017) and community pharmacies` perspectives (Al-Khalaileh et al. 2019), it was important to evaluate the problem from ophthalmologists` perspective as well.

In literature, many studies highlighted the importance of raising awareness of ophthalmologists regarding the risk of ophthalmic drugs abuse (Darcin et al. 2011; Bersani et al. 2013; Wazaify et al. 2017) but, none had evaluated their knowledge regarding this issue. To the best of our knowledge, this is the first study to provide background about ophthalmologists' knowledge, attitude and practice of ophthalmic products liable to abuse and where the gaps that need to be filled exactly are.

## Materials and methods

### Study design, setting, and subjects

This is a cross-sectional survey that was conducted in Amman, Jordan between October 2016 and January 2017 to evaluate ophthalmologists' experience regarding ophthalmic drug abuse and misuse. During the study period, a total of 207 questionnaires were distributed to all ophthalmologists of all levels (specialists, consultants, residents and pediatricians) working at different public and private hospitals, eye centers and eye clinics in Amman ,the capital of Jordan. Ophthalmologists were asked to participate in this study by filling a pre-validated, pre-piloted questionnaire. Ethical approval was obtained from Institutional Review Board (IRB) at Jordan University Hospital (JUH), in addition to the approval of Graduate Studies Committee at The School of Pharmacy-The University of Jordan.

### Study questionnaire and data collection

The research team constructed the questionnaire over several stages (i.e- reviewing the literature, drafting and reviewing then brainstorming and filtering questions until a consensus was

achieved). Face validity was ensured by sending the questionnaire draft to two experts (one in clinical pharmacy and the other in ophthalmology) for reviewing. Content validity was achieved by extensive literature review to assure that all-important items were included. The questionnaire was piloted on a 5% of the total target sample (n=6).The pilot study was conducted to identify potential problem areas and deficiencies in the research instruments and protocol prior to implementation of the definitive study.

The final version of the self-filled questionnaire was then distributed using drop-and-pick technique. The first author (WA) went to different ophthalmic clinics and handed the questionnaire personally to all ophthalmologists available in the clinic. The completed surveys were picked up at a later time. The questionnaire was anonymous and included of a covering letter followed by two sections:

**Section one:**

General demographic details were collected. Participants were requested to state their (age, gender, clinic location, employment, country from where they had obtained the certificate of competence in Ophthalmology, their experience as practitioners and their working duration at the current place).

**Section two:**

This part was established to measure the scope of knowledge and practice regarded to ophthalmic drugs abuse among ophthalmologists, and included the following:

- A clear definition of the term '*abuse'* followed by Yes/No question regarding their knowledge about ophthalmic drug abuse. A "yes" answer requested completing the remaining questions.

- Ophthalmologists' knowledge regarding the abuse of some ophthalmic drugs and the reason behind it. We listed the drugs in a form of table of two columns; one for active ingredients and one for brand names to measure their awareness of both. Then, we expressed their knowledge based on their answers in a scale from one to ten. If ophthalmologists choose the right ophthalmic product and wrote the right explanation they had taken the point, and same for those who choose the right ophthalmic product without writing the reason, because we don't know actually if they really know the reason or not. On the other hand, those who selected the wrong product (e.g. products not liable to abuse) or the right product, but with a wrong explanation (e.g. considering the misuse cases as abuse), they didn't take the point

- A Yes/No question regarding their practical experience with ophthalmic drug abuse, followed by a space for free text response to explain their experience in case of affirmative answer.

- A space for free text response to add any other information that could be useful for the study.

**Statistical analysis**

All data were coded and entered into the Statistical Package for Social Sciences (SPSS) database (version 23) for statistical analysis. Descriptive analysis and frequency distributions were collected for responses to all questions. Categorical variables were expressed as frequency and percentage. Linear regression was used to determine the relationship between the categorical variables and the knowledge scale. A p-value less than 0.05 was considered significant throughout the analysis.

**Free Text Response Analysis**

Content analysis method was used to analyze the qualitative data from some questions in the survey. The responses have been read, summarized and gathered under potential thematic categories.

**Results**

**Demographic details of participating ophthalmologists**

A total of 143 out of the 207 questionnaires distributed were returned (response rate = 69.1%). Six questionnaires were excluded due to insufficient data, which ended up with a net number of 137 questionnaires to be analyzed.

Most of the responding ophthalmologists in our sample were male (n=101, 73.7%). A little less than half were resident doctors (n=59, 43.1%). Twenty nine percent of ophthalmologists (21.2%) were specialists and the remainder were consultants and pediatricians, respectively (n=30, 21.9%; n=8, 5.8%). The majority of participating ophthalmologists (n= 51, 37.2%, n=52, 38%) were between 20-30 and 31-40 years, respectively. Almost one-quarter of respondents worked at independent clinics (n=21, 22.6%) and the majority of the ophthalmologists' work place was located in west Amman (n=91, 66.4%). A description of our sample is provided in **Table I**.

**Assessment of Ophthalmologists' Knowledge Regarding Ophthalmic Products Abuse**

**a) Ophthalmologists' knowledge assessment regarding the definition of abuse**

**b)** The majority of participating ophthalmologists (n=120, 87.6%) reported that eye drops were part of drugs that could be liable to abuse. Most of the seventeen ophthalmologists who thought eye drops abuse was not possible were male (n=14, 82.4%) and consultants (n=10, 58.8%). Content analysis of ophthalmologists' answers indicated that 47.4% (n=65) of

ophthalmologists were aware of the correct definition of abuse and realized the difference between the terms *abuse* and the *misuse*, while 25.5% (n=35) mixed both terms, abuse and misuse, under the abuse definition. The remainder, 14.6% (n=20) have totally misunderstood the concept of abuse and considered misuse cases as abuse (**Table II) Ophthalmologists' knowledge assessment regarding ophthalmic products liable to abuse**

On the knowledge scale out of 10, the range of scores was 0-8/10, and the average score was 4.2/10. All ophthalmologists who said that ophthalmic products were not liable to abuse scored zero.

Simple linear regression analysis revealed no significant relationship between the ophthalmologists' gender, experience, clinic location or the country where a degree in ophthalmology obtained with the knowledge score (P-value> 0.05). On the other hand, there was a statistically significant relationship between the ophthalmologists' age and the knowledge score as well as a between being consultant ophthalmologist and the knowledge score (P-value<0.05 for both). Ophthalmologists who aged 40 years or less had more knowledge with regard to ophthalmic products abuse, whereas ophthalmologists who were consultants knew less about this problem. **Table III** presents the simple linear regression analysis of factors affecting ophthalmologists' knowledge regarding ophthalmic products abuse.

**c) Ophthalmologists' knowledge assessment regarding specific ophthalmic drugs abuse**

**i. Cycloplegics and Mydriatics abuse**

***Cyclopentolate (Pentolate® )***

The analysis indicated that most of ophthalmologists (n=92/137, 67.2%) were aware of Cyclopentolate eye drop abuse, the majority selected the brand name Pentolate® (n=86/137, 62.8%) while almost half of them (n= 63/137, 46%) selected the chemical name Cyclopentolate. Less than half (41.6%) of ophthalmologists (n=57/137) were aware of both the brand name as well as the active ingredient.

Many reasons behind the abuse of Pentolate® eye drop were reported, although 33.7% of them (n=31/92) did not mention the reason.

Only four resident ophthalmologists reported that abusers use Pentolate® through nasal route and three specialists said that abusers used to drink it. Summary of the reasons behind Cycloentolate (Pentolate®) abuse are presents in **Figure 1**.

***Tropicamide (Mydriacyl® )***

The analysis indicated that most of ophthalmologists were not aware of Tropicamide abuse. Sixteen ophthalmologist selected the brand name Mydriacyl® (11.7%) where six ophthalmologists (4.4%) selected the chemical name Tropicamide. Only four doctors selected both, chemical and brand name (2.9%). The reported reasons behind the abuse of Mydriacyl® were: intentionally using it to have a blurred vision, so get a sick-leave from work (n=4/16, 25%), used as additive on water-pipe (n=1/16, 6.2%) while the remainder did not mention any reason (n=11/16, 68.8%). All ophthalmologist who had selected the chemical name, tropicamide, did not mention any reason behind the abuse.

### ii. Ophthalmic decongestants abuse

More than half of participating ophthalmologists (n= 73, 53.3%) had selected Prisoline® as a drug of abuse. Only 5/73 (6.8%) realized that Prisoline® contained both Naphazoline and

Chlorpheniramine Maleate, while 22/73 doctors (30.1%) were aware that prisoline contains Naphazoline as an active ingredient. The reported reasons behind the abuse of Prisoline® were diverse, but only six ophthalmologists out of 73 (8.2%) reported that Prisoline® used to feed addiction. **Figure 2** summarizes the reported reasons behind Prisoline® abuse reported by ophthalmologists.

Moreover, Naphcon-A® (naphazoline hydrochloride and pheniramine maleate), Apihist® (antazoline sulphate and naphazoline nitrate), and Ophtazoline® (antazoline sulphate and naphazoline nitrate) eye drops were also reported to be liable to abuse by ophthalmologists (n= 41, 29.9%, n= 25, 18.2%, n= 24, 17.5%, respectively). Only one ophthalmologist (0.7%) said that Naphcon-A® was used to feed addiction.

### iii. Witch hazel Eye Bright® eye drop abuse

Almost one sixth of ophthalmologists (n=24, 17.5%) had reported Eye Bright® eye drop as liable to abuse. Only four ophthalmologists out of 24 (16.7%) had selected both the chemical name, *witch hazel*, as well as the brand name. The perceived reasons behind the abuse of Eye Bright® eye drop were: Eye- brightening (n=8/24, 33.3%), eye redness removal after abusing other drugs (e.g. marighuana; n=1/24, 4.2%) in addition to reported misuse such as using it for a longer than recommended time (n=3/24, 12.5%). Twelve participants did not mention any reason (50%).

### iv. Ophthalmologists' knowledge assessment regarding other ophthalmic drugs abuse

One sixth of ophthalmologists (n=22, 16.1%) reported one antibiotic eye drop or more as being liable to abuse. However, all reported cases were of misuse, e.g. using eye drops for: viral

infection and eye redness removal. It was also reported that some patients used antibiotic eye drops PRN and without prescription.

Content analysis of free text reported by respondents, indicated that some ophthalmologists (n=15, 11%) reported eye drops containing steroids as being liable to abuse. The only reported reason for abuse mentioned was eye brightening. Steroids were expressed by either Cortisone eye drops or by the brand name as (Tobradex® (Tobramycin and Dexamethasone), FML® (fluorometholone), and Predforte® (prednisolone acetate))

Eye drops containing Prostaglandin analogue as Xalatan were also reported to be liable to abuse by three ophthalmologists (2.2%), who mentioned that such eye drops, were abused by females to get longer eyelashes.

Topical ophthalmic anesthetics as Novesin® (Oxybuprocaine) were also reported by another three ophthalmologists (2.2%). According to respondents, such drugs were reported to be frequently abused by welders.

**d) Ophthalmologists' Practice Assessment Regarding Ophthalmic Products Abuse**

In the last part of the questionnaire, ophthalmologists were asked if they had ever been asked to write a prescription and suspected that the purpose behind it was the "non-medical use" ie- abuse of the drug. A total of 41.6% of respondents (n=57) reported that they had received such requests. The number of prescription-requests reported by ophthalmologists was 63 requests. Almost half of these prescriptions were for Pentolate® (n=32, 50.8%). **Table IV** describes the prescriptions content as reported by ophthalmologists.

**Discussion**

The main aim of this study was to establish a background regarding KAP of ophthalmic drug misuse/abuse among ophthalmologists in Jordan. To the best of the author's knowledge, this study is the first of its kind in Jordan and worldwide to evaluate the KAP of ophthalmologists' regarding ophthalmic products abuse and misuse. Two studies conducted previously in Jordan investigated the abuse of ophthalmic products from community pharmacists' perspective (Wazaify et al. 2017) and from community pharmacies perspective (Al-Khalaileh et al. 2019). In this study, the majority of participating ophthalmologists (87.6%) reported that ophthalmic products were liable to abuse, but the content analysis showed that only 47.4 % of ophthalmologists knew the correct definition of abuse in comparison to 77.3% of final year pharmacy students (Jaber et al. 2015). This could be explained by the difference between the specialties, in addition to the fact that the previous study used a yes/no question to assess their knowledge regarding the difference between misuse and abuse definition where the present study depended on analyzing their answers to know if they knew the difference or not. On the other hand, reporting "to know" is diffferenet from "actually knowing". A study by Almaaz et al., reported that 56.6% of anesthesia personnel in Jordan said that they knew the difference between the terms *abuse* and *misuse* where the analysis of the surveys showed that less than 10% knew the correct difference between the two terms (Al-Maaz et al. 2019).

In the literature, many definitions for misuse and abuse are reported by different organizations (e.g., World Health Organization (WHO), the U.S Food and Drug Administration (FDA), National Poison Data System, and American Medical Association – Council on Scientific Affairs, and the Panel on Alcoholism and Drug Abuse (Smith et al. 2013). Most of these definitions had emphasized that drug misuse is when the substance use does not follow the therapeutic instructions (ie, not as the prescribed duration or dosing) and in some definitions, as

the definition stated by U.S. FDA, proposed that using the substance to look for euphoric or psychotropic effects does not fall within the definition of misuse, which occurs only when a substance is taken with a therapeutic reason. On the other hand abuse definition among all definitions stated by the previous organizations unanimously agreed that abuse occur when the substance use for non-medical reason (ie, for euphoria, hallucination, anxiolytic, or sedative effects (Smith et al. 2013).

The data of the present study revealed the lack of ophthalmologists' awareness regarding the correct definitions of "abuse" and "misuse". This could attributable to lack of study material concerned with drug misuse and abuse during the years of medical school (JU 2019).

The average knowledge score of ophthalmologists about ophthalmic drug abuse was 4.2/10. This low score could attributable to unawareness of misuse and abuse terms between ophthalmologists as mentioned above. In addition, eighteen (13.1%) ophthalmologists scored zero and they affected negatively the total average.

The simple linear regression analysis showed that ophthalmologists who were consultants or those older than 40 years knew less about ophthalmic products liability for abuse. A possible explanation is that most of suspected abusers were between 21-40 years old (Al-Khalaileh et al. 2019). Therefore, ophthalmologists who were of the same age group could be more aware of such type of use. Another explanation could be that in the literature it was reported that physicians in general demonstrated a negative association between increasing age and performance. They may become less aware of certain details concerning their patients as they become in practice longer of time (Choudhry et al. 2005).

Most ophthalmologists in our sample (67.2%) reported cyclopentolate as being liable for abuse and 11 ophthalmologists had mentioned that abusers use it by mixing with water-pipe (Narghile), this somewhat matched what had been reported by pharmacists in Jordan by Wazaify et al. regarding mixing other medications (e.g. chlorpheniramine, pregabalin, and benzodiazepines with water-pipe) (Wazaify et al. 2017). A possible explanation of ophthalmologists' awareness is that this kind of abuse is widespread in Jordan and found a lot in community pharmacies (Al-Khalaileh et al. 2019).

None of our ophthalmologists were aware of the abuse of tropicamide mentioned in literature, to be abused through IV injection for intensifying the pleasurable effect of heroin and delaying or minimize the heroin withdrawal symptoms despite the many studies highlighted this issue (Bersani et al. 2013; Spagnolo et al. 2013; Bersani et al. 2015; Bozkurt et al. 2015). A possible explanation that such practice is not common in Jordan yet like in Eastern Europe (Van Hout 2018). It is worth noting that four ophthalmologists had reported that this eye drop used intentionally to get a blurred vision so get a sick leave from work. This could be a new type of abuse that opens up new questions as what percentage of people are using this way to get leave from work, what other medicines may be used for this purpose, and how these people knew this type of information. Web and social media could play an important role in such information. Searching for health information and participating in support groups to get access for online health information is very common behavior among public (Cline & Haynes 2001).

In the free text space content, ophthalmologists had reported many other ophthalmic products liable to abuse from their point of view. Prostaglandin analogue was one of these products; three ophthalmologists mentioned that females to get longer eyelashes they abuse such eye drops. Some articles had covered the use of these products as a cosmetic for eyelashes (Jones 2011;

Titcomb 2012). The use of term "abuse" may not be a precise here because Bimatoprost, which is a prostaglandin ethanolamide analog, has approved by the FDA to be the first and only choice for the treatment of hypotrichosis (condition of abnormal hair patterns - predominantly loss or reduction) of eyelashes (Fagien 2010).

Another ophthalmic product reported by ophthalmologists in the free text space was the topical ophthalmic anesthetic. Three ophthalmologists had reported that welders abused these products frequently. This practice among welders had been reported in other countries as Iran, whereas 314 (80.5%) of welders participated in the study reported that they had used topical ophthalmic anesthetic at least once during their working lives (Sharifi et al. 2013). Although, the literature is full of case reports and series – using the abuse term- to express the use of topical ocular anesthetics (Rosenwasser et al. 1990; Kim et al. 1997; Yagci et al. 2011; Matti & Saha 2012; Erdem et al. 2013; Tok et al. 2015). The sought effect for such use, as mind-altering effect, was never mentioned in any of them.

**Limitations of the study**

This study had been limited by the following: 1) dealing with such a busy pool of healthcare professionals, scheduling time to drop the empty questionnaires and pick them later was a big issue and it is believed that a number of filled questionnaires may have been lost during the process. 2) The target group of ophthalmologists similar to many physicians, is that they were busy and offered a minimal time. However, the constructed questionnaire was conducted to be brief and short. 3) The author's delivered the questionnaires to ophthalmologists by hand. Although the success of this strategy was reflected in the high response rate (69.1%), it also

could have affected the anonymity of the questionnaire and subsequently whether ophthalmologists felt comfortable to freely report their experience. We recommend that future studies use social media or specialized ophthalmologist' websites for such studies. 4) The questionnaire mentioned some suspected ophthalmic drugs of abuse which may consequently have drawn the participating ophthalmologists' attention to these drugs. However, the authors tried to minimize such unintended bias by including different types of ophthalmic drugs (including those not liable for abuse) in the questionnaire. 5) The questionnaire was completed by ophthalmologists in Amman, the capital of Jordan, which is not representative of the whole Jordan. It is recommended that future studies involve a larger number of hospitals, clinics, and ophthalmic centers in different regions all over Jordan.

## Conclusion

The majority of participating ophthalmologists reported that ophthalmic drugs have the potential to be misused and abused, despite that their knowledge score in regard to this was not satisfactory. The study also reported that more than half of participating ophthalmologists were not aware of the true definition of abuse. By this, the study has shed the light on the gaps in knowledge among ophthalmologists with regard to abuse and misuse concepts. Therefore, increasing awareness of ophthalmologists and other health care professionals about this new and alerting type of abuse should be implemented. Moreover, the study had showed that almost half of the respondents have been asked to write a prescription which they suspected for abuse purpose. This calls the attention for implementation an addiction training in medical schools and effective community pharmacy based interventions to raise patient, ophthalmologists, and

pharmacists awareness regarding ophthalmic drug potential for abuse and ultimately monitor prescribing and or dispensing on these products to only those in need.

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**Table I: Demographic and Professional Experience Details Of Participating Ophthalmologists (N=137)**

| Variable | N | % |
|---|---|---|
| **Age** | | |
| 20-30 years | 51 | 37.2% |
| 31-40 years | 52 | 38% |
| 41-50 years | 16 | 11.7% |
| >50 years | 18 | 13.1% |
| **Gender** | | |
| Male | 101 | 73.7% |
| Female | 36 | 26.3% |
| **Current Position** | | |
| Resident Doctor | 59 | 43.1% |
| Specialist Ophthalmologist | 40 | 29.2% |
| Consultant Ophthalmologist | 30 | 21.9% |
| Specialist/Consultant Pediatric Ophthalmologist | 8 | 5.8% |
| **Country where degree in Ophthalmology obtained** | | |
| Jordan | 113 | 82.5% |
| Other countries | 24 | 17.5% |
| **Clinic/Hospital site** | | |
| West Amman | 91 | 66.4% |
| East Amman | 36 | 26.3% |
| Outside Amman | 10 | 7.3% |
| **Clinic location** | | |
| Government hospital | 55 | 40.1% |
| Private hospital | 51 | 37.2% |
| Independent clinic | 31 | 22.6% |
| **Experience** | | |

| | | |
|---|---|---|
| < one year | 17 | 12.4% |
| 1-5 years | 56 | 40.9% |
| 6-10 years | 21 | 15.3% |
| >10 years | 43 | 31.4% |
| **Work duration in the current place** | | |
| < one year | 32 | 23.4% |
| 1-5 years | 64 | 46.7% |
| 6-10 years | 14 | 10.2% |
| >10 years | 27 | 19.7% |
| Overall | 137 | 100% |

**Table II. Summary of the frequencies and the positions of ophthalmologists with regard to their awareness of the concept of abuse (N=137)**

| | **Resident Doctor % (n)** | **Specialist % (n)** | **Consultant % (n)** | **Pediatric % (n)** |
|---|---|---|---|---|
| **Aware of abuse definition** | 17.5% (24) | 19% (26) | 8% (11) | 2.9% (4) |
| **Mixed up definitions of misuse and abuse** | 14.6% (20) | 5.8% (8) | 2.9% (4) | 2.2% (3) |
| **Misunderstood the concept of abuse *** | 6.6% (9) | 3.6% (5) | 3.6% (5) | 0.7% (1) |
| **Ophthalmic products not liable for abuse** | 4.4% (6) | 0.7% (1) | 7.3% (10) | 0% (0) |

*Misuse reasons were misreported by ophthalmologists as abuse, such as using ophthalmic products without prescription and over use of such products for long time without justified reasons

**Table III. Simple linear regression analysis of factors affecting ophthalmologist's knowledge regarding ophthalmic products abuse**

| Factors affecting ophthalmologist's knowledge | Dependent variable: Knowledge scale | | | | |
|---|---|---|---|---|---|
| | **B Estimate** | **SE** | **Beta** | **R^2 %** | **P value** |
| **Gender [ 1: male, 2: female ]** | -0.283 | 0.423 | -0.058 | 0.34% | 0.504 |
| **Age [ 1:<= 40 years, 2: > 40 years ]** | -1.025 | 0.423 | -0.204 | 4.2% | 0.017 * |
| **Country where degree in Ophthalmology obtained [ 1: Jordan, 2: Else ]** | 0.067 | 0.491 | 0.012 | 0.01% | 0.892 |
| **Current Position [ 1: Consultant, 2: Other ]** | -1.187 | 0.440 | -0.225 | 5.1% | 0.008 * |
| **Experience [ 1:<= 5 years, 2: > 5 years ]** | -0.288 | 0.373 | -0.066 | 0.44% | 0.442 |
| **Clinic Location [ 1: Hospital, 2: Private clinic ]** | -0.44 | 0.444 | -0.087 | 0.76% | 0.315 |

*: statistical significant

**Table IV. Prescription requests reported by ophthalmologists to be suspected of abuse (N = 63)**

| Prescriptions Content | (N) | % |
|---|---|---|
| Pentolate® or Cyclopentolate | 32 | 50.8% |
| Prisoline®, Naphcon-A®, or Naphzoline | 9 | 14.3% |
| Prostaglandin analogue or Xalatan® | 2 | 3.2% |
| Ophthalmic steroids | 7 | 11.1% |
| Antibiotic eye drops | 4 | 6.3% |
| Topical ophthalmic anesthetics or Oxybuprocaine® | 2 | 3.2% |
| Other * | 7 | 11.1% |

*Ophthalmic lubricants, Antiglaucoma agents, and to exchange the products from the pharmacy and get benefit from insurance

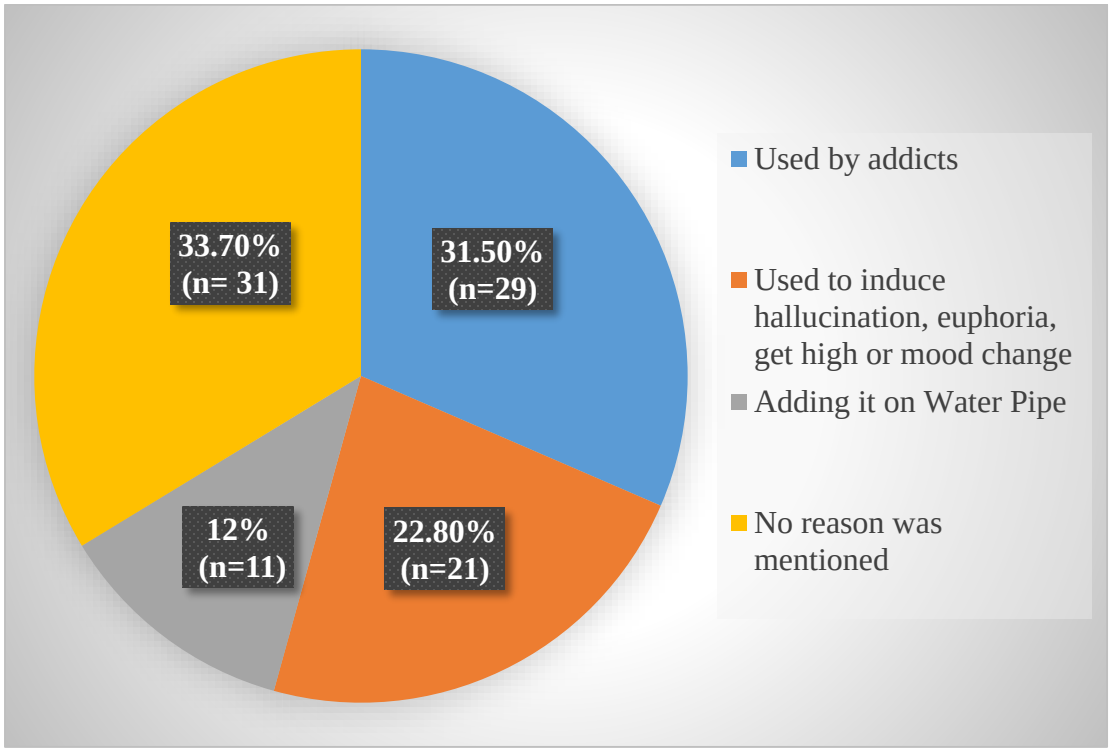


**Figure 1: Reasons behind Pentolate® (cyclopentolate) abuse reported by ophthalmologists (N= 92)**

* Different expressions reported by ophthalmologists

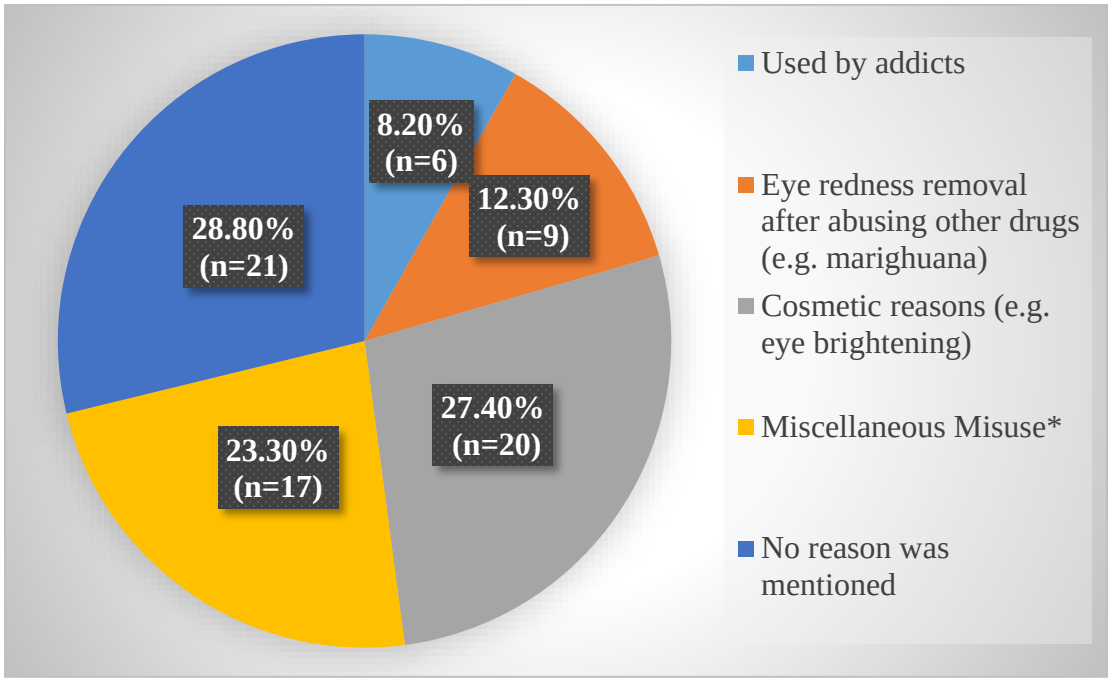


**Figure 2: Reported Reasons behind Prisoline® (naphazoline+ chlorpheniramine) abuse reported by ophthalmologists (N=73)**

*Misuse reasons were misreported by ophthalmologists as abuse, such as using it without prescription, the over use of it for long time and frequently use it by welders.