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PREVALENCE AND CRIMINOLOGICAL ASPECTS OF ALCOHOL AND OTHER DRUG USE IN DRIVERS TESTED IN URBAN SETTINGS DURING THE CORONAVIRUS PANDEMIC.

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Resumen: La siniestralidad vial constituye un problema de salud pública. La relación entre siniestralidad y consumo de sustancias tóxicas es incuestionable. En 2020 la pandemia por el COVID-19 provocó una crisis sanitaria sin precedentes y se adoptaron medidas que limitaron la movilidad de los ciudadanos. También se observaron cambios en los patrones de consumo de sustancias tóxicas. Se registró un descenso en la prevalencia del consumo de alcohol, tabaco, cannabis y cocaína y un aumento en el consumo de hipnosedantes sin receta. En el presente estudio, nos planteamos conocer la prevalencia del consumo de alcohol y de otras drogas en una población de conductores en el ámbito urbano sometidos a pruebas de detección y la posible repercusión sobre la seguridad vial que tuvieron las medidas de restricción de la movilidad, instauradas durante la pandemia. Para ello hemos realizado un estudio transversal descriptivo en conductores de vehículos en las vías urbanas y travesías de la ciudad de Santander, en el año 2020. Se realizaron 3.680 pruebas de determinación de alcohol y 275 de otras drogas. Nuestros resultados demuestran que en el 20,82% de las actuaciones se encontraron resultados positivos al alcohol y/u otras drogas. El perfil del conductor que muestra la presencia de alcohol es varón entre los 25 a 44 años, que circula en fin de semana entre las 11 de la noche y las 7 de la madrugada y presenta una tasa de alcohol en aire espirado superior a 0,60 mg/l. El perfil del conductor positivo a otras drogas es varón, entre 25 a 44 años que circula cualquier día de la semana, entre las 7 de la tarde y las 12 de la madrugada. Las principales sustancias consumidas son el cannabis (75,31%) y la cocaína (44,03%). Se constata que durante los meses en los que no hubo confinamiento el 13,02% de las alcoholemias realizadas y el 30,19% de las pruebas de detección de otras drogas fueron positivas, mientras que en el período de confinamiento los porcentajes subieron al 23,44% y al 38,57%, respectivamente.

Palabras clave: Alcohol, drogas, seguridad vial, COVID-19.

Abstract: Traffic accidents constitute a public health problem. The relationship between traffic accidents and the consumption of toxic substances is undeniable. In 2020, the COVID-19 pandemic caused an unprecedented health crisis which led to measures being adopted in limiting citizen mobility. A subsequent change in the consumption patterns of toxic substances was also observed. There was a decrease in the prevalence of alcohol, tobacco, cannabis, and cocaine use, and contrarily an increase in the consumption of non-prescription sedatives. The aim of this study is to analyse the prevalence of alcohol use and other psychoactive substances in a population of drivers subjected to alcohol and other drug testing in urban areas. This study evaluates the possible impact that mobility restriction measures adopted during the pandemic had on road safety. To achieve this, we carried out a cross-sectional descriptive study on vehicle drivers on urban roads and

crossings in the city of Santander in the year 2020, where we conducted 3,680 alcohol tests and 275 other drug tests. Our results demonstrate that positive results for alcohol and/or other drugs were found in 20.82% of the cases. The profile of the driver positive for alcohol shows a male driver between the ages of 25 and 44, who drives during the weekend between 11 pm and 7 am and presents a breath alcohol level higher than 0.60 mg/l. The profile of the driver positive for other drugs is male, between 25 and 44 years old, who drives with a uniform distribution throughout the week, in the period between 7 pm and midnight. The main substances in this profile are cannabis (75.31%) and cocaine (44.03%). It is confirmed that during the months without confinement, 13.02% of the alcohol tests and 30.19% of other drug tests were positive, while during the confinement period the percentages rose to 23.44% and 38.57%, respectively.

Keywords: Alcohol, drugs, road safety, COVID-19.

1. INTRODUCTION

The World Health Organisation (WHO) considers road accidents to be a global public health priority. Every year globally, approximately 1.35 million people die and about 50 million people suffer non-fatal injuries from road accidents, and many of these injuries result in disability (WHO, 2018). In 2022, the European Union experienced a 3% increase in road accident fatalities compared to the previous year (reaching 20,600 victims) as a result of the resumption of mobility after the pandemic. In the same period, Spain had a rate of 36 deaths per million inhabitants, lower than the European average of 46 (European Commission, 2023).

The link between accident rates and psychoactive substance use is undeniable. The presence of these substances in the body affects the driver's abilities to a greater or lesser extent, posing a risk to road safety. According to the results of the autopsies performed, 52.81% of the drivers killed in 2022 tested positive for alcohol, drugs of abuse and psychotropic drugs (INTCF, 2023). This is a worrying figure and there has been an upward trend over the last five years, given that the percentage was 42.1% in 2017. Alcohol is the most common intoxicant and its consumption is very socially acceptable, with 64.5% of Spaniards (almost two thirds) admitting to having consumed it in the last 30 days (EDADES, 2022). First consumption occurs at an early age (16.5 years) and 93.2% of 15–64 year olds report having consumed it at some time in their lives. Among illegal psychoactive substances, cannabis and cocaine stand out for their high prevalence. Some medicines, although consumed less frequently than alcohol, also pose a growing threat to road safety.

The Covid-19 pandemic put the world in an unprecedented and unfamiliar situation that led to an unprecedented health crisis. On 14 March 2020, a state of emergency was declared, which resulted in the population being locked down. On 28 April, a plan was announced to gradually reduce the lockdown restrictions. In relation to the issue at hand, a change in patterns of substance use was observed. In Spain, there was a decrease in the prevalence of alcohol, tobacco, cannabis and cocaine use, and an increase in the use of hypnosedatives without prescription (OEDA, 2020). Alcohol and cannabis use decreased in both sexes and at all ages, with a more pronounced decrease among young people under 25 years of age. However, the use of hypnosedatives without prescription increased: from 1.9% in the months prior to the survey, it rose to 3.1%, a statistically significant increase that was more pronounced among women. This increase was found in all age groups, although to a greater extent in subjects between 25 and 54 years of age. During the most severe peaks of the pandemic, a decrease in alcohol and drug testing was also observed. They were sometimes limited to road accidents and situations where erratic driving or symptoms suggesting the influence of intoxicants on driving were observed.

In the summer of 2020, health measures were more flexible and certain restrictions remained in force in catering establishments, especially those related to nightlife, a sector closely linked to the field of road safety given its special relationship with alcohol consumption. Following the adoption of the state of emergency in response to the second wave of the pandemic, a night-time curfew (between 11 pm and 6 am) was maintained from 26 October and remained in force beyond the end of the study. Therefore, all these restrictions had an impact on citizens' mobility and nightlife, and consequently on road safety.

In this study, we set out to find out the prevalence of alcohol and other psychoactive substance use in a population of drivers screened in urban settings, and the possible impact of mobility restriction measures adopted during the pandemic on road safety in terms of substance use.

2. METHODOLOGY

2.1. Study design and target population.

We conducted a descriptive cross-sectional study. The study sample consists of drivers of vehicles that travelled on the roads of the city of Santander (urban roads and crossings) throughout 2020. This sample was selected in accordance with the provisions of the General Road Traffic Regulations (RGC), which specifies who is required to undergo the legally established tests for alcohol and other drugs. In this respect, the inclusion criteria were as follows (Art. 21 RGC):

"*a) any road user or vehicle driver directly involved in a road traffic accident as a possible liable party.*

b) those who drive any vehicle with obvious symptoms, manifestations or facts which give rise to a reasonable presumption that they are driving under the influence of alcoholic beverages.

c) drivers who are reported for committing any of the infringements of the rules contained in these regulations.

d) those who, when driving a vehicle, are required to do so by the authorities or their agents as part of a programme of preventive breathalyser checks ordered by those authorities.

A total of 120 variables from the report and official databases were analysed and classified into the following blocks: 1) socio-demographic data of the driver; 2) vehicle information; 3) general details of the event; 4) type of offence or crime; 5) previous history; 6) toxicological findings related to alcohol or drugs; 7) crash information (if applicable).

In accordance with Table 1two periods were defined, differentiating between working days and weekends/holidays. In addition, each day was divided into three time slots: morning, evening and early morning.

Table 1. Periods and time slots for recruitment of subjects.

General periods	
Working days	From Monday at 7:00 am to Friday at 11:59 pm.
Weekends/holidays	From Saturday at 00:00 am to Monday at 6:59 am. Holidays from 00:00 am to 11:59 pm
Time intervals	
Morning	From 7:00 am to 3:59 pm.
Evening	From 4:00 pm to 10:59 pm.
Early morning	From 11:00 pm to 06:59 am.

Source: Marcos Ortiz (2023)

The Santander Police Report Unit carried out tests for alcohol in exhaled air and drugs in oral fluid. During the preventive checks, drivers were randomly selected. In the case of substances other than alcohol, a preliminary test was carried out following the established protocol, which was then followed by the collection of samples for subsequent toxicological analysis by solid-liquid extraction technique and liquid chromatography coupled to tandem mass spectrometry in a specialised laboratory. Only substances that showed positive results in the initial test were analysed and an upper quantification limit of 500 ng/ml was applied. The substances and metabolites tested were exclusively delta-9-tetrahydrocannabinol, amphetamine, methamphetamine, MDEA, MDMA, MDA, cocaine, benzoylecgonine, morphine, 6-acetyl-morphine (heroin) and codeine.

2.2. Statistical processing

The data collected was coded for statistical analysis using IBM SPSS Statistics software (version 28). A descriptive study was carried out, analysing frequencies and percentages for qualitative variables and mean, median and standard deviation for quantitative variables. We used a contingency table analysis to explore the association between variables through Pearson's Chi-square statistical test, performing a corrected standardised residuals analysis to interpret the association. P values < 0.05 were considered significant.

3. RESULTS

During 2020, 3,680 breath alcohol tests and 275 saliva drug tests were carried out in Santander. In this period, 766 (20.82%) actions were documented with positive results for different psychoactive substances, of which 522 were for alcohol (14.19% of the breathalyser tests carried out) and 243 for other drugs (88.36% of those carried out). In 29 subjects, the tests were positive on two different occasions and in two individuals on three occasions.

Of the 766 drivers subjected to the analysis (see Table 2), 89.95% were men with an average age of 38.96 ± 0.47 (SD 12.25), within an age range of 15 to 84 years. 10.05% were women, with a mean age of 37.70 ± 1.31 (SD 11.50), ranging from 20 to 70 years. The majority of drivers (58.49%) who tested positive for a psychoactive substance were in the 25–44 age group. Spanish nationality predominated in 85.51% of the cases and car driving accounted for 86.42%. 74.94% of the positive tests were carried out on the city's

main roads. The highest prevalence was observed on weekdays during the evening period (32.12%) and on weekends/holidays in the early morning (33.29%). In terms of offences related to psychoactive substances, 67.10% showed alcohol levels above the permitted limits, 30.68% showed the presence of other drugs, and 1.04% showed a combination of alcohol and other drugs. In addition, 1.17% of drivers refused to be tested.

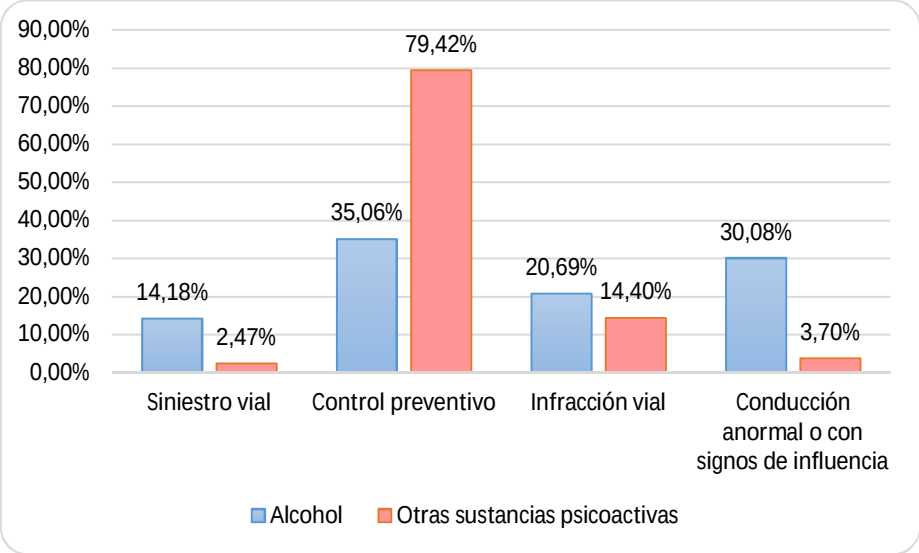
Table 2. Socio-demographic characteristics of the sample studied.

	Male, n = 689		Female, n = 77		Total, n = 766	
	n (%)		n (%)		n (%)	
Gender	689 (89.95)		77 (10.05)		766 (100%)	
Average age	38.96 ± 0.47 (DS 12.25)		37.70 ± 1.31 (DS 11.50)		38.83 ± 0.44 (DS 12.17)	
Age group						
15–24 years	88 (12.77)		11 (14.29)		99 (12.92)	
25–34 years	196 (28.45)		23 (29.87)		219 (28.59)	
35–44 years	207 (30.04)		23 (29.87)		229 (29.90)	
45–54 years	111 (16.11)		15 (19.48)		127 (16.58)	
55–64 years	72 (10.45)		3 (3.90)		75 (9.79)	
65 and over	15 (2.18)		2 (2.60)		17 (2.22)	
Country of origin						
Spain	592 (85.92)		63 (81.82)		655 (85.51)	
Latin America	50 (7.26)		11 (14.29)		61 (7.96)	
Rest of Europe	39 (5.66)		3 (3.90)		42 (5.48)	
Africa	5 (0.44)		0 (0.0)		5 (0.65)	
Asia	3 (0.73)		0 (0.0)		3 (0.49)	
Type of vehicle						
Saloon	594 (86.21)		68 (88.31)		662 (86.42)	
Motorbike	44 (6.39)		3 (3.90)		47 (6.14)	
Van	21 (3.05)		2 (2.60)		23 (3.0)	
Moped	16 (2.32)		3 (3.90)		19 (2.48)	
Other	14 (2.03)		1 (1.30)		15 (1.96)	
Period	W	WE/PH	W	WE/PH	W	WE/PH
Morning (7:00 am to 3:59 pm)	8 (1.16)	26 (3.77)	1 (1.30)	4 (5.19)	9 (1.17)	30 (3.92)
Evening (4:00 pm to 10:59 pm)	233 (33.82)	103 (14.95)	13 (16.88)	5 (6.49)	246 (32.12)	108 (14.10)
Early morning (11:00 pm to 6:59 am)	94 (13.64)	225 (32.66)	24 (31.17)	30 (38.96)	118 (15.40)	255 (33.29)
Presence of psychoactive substances						
Alcohol	450 (65.31)		64 (83.12)		514 (67.10)	
Other drugs	225 (32.66)		10 (12.99)		235 (30.68)	
Alcohol + other drugs	7 (1.02)		1 (1.30)		8 (1.04)	
Refusal to carry out the tests	7 (1.02)		2 (2.60)		9 (1.17)	

Note: W (Weekday) WE/PH (Weekend/Public Holiday)
Source: Adapted from Marcos Ortiz (2023)

Figure 1 illustrates the circumstances leading to the testing and the substances found. In the case of alcohol, 35.06% of the positive results arose in the context of preventive controls, 30.08% after showing signs of being under the influence of alcohol, 20.69% after committing a traffic offence and 14.18% as a result of a road accident. For drugs, 79.42% of positives were recorded as a result of a preventive control, 14.40% as a result of an offence, 3.70% as a result of abnormal driving or signs of being under the influence of drugs and 2.47% as a result of a road accident.

Figure 1. Reason for testing according to substance identified.

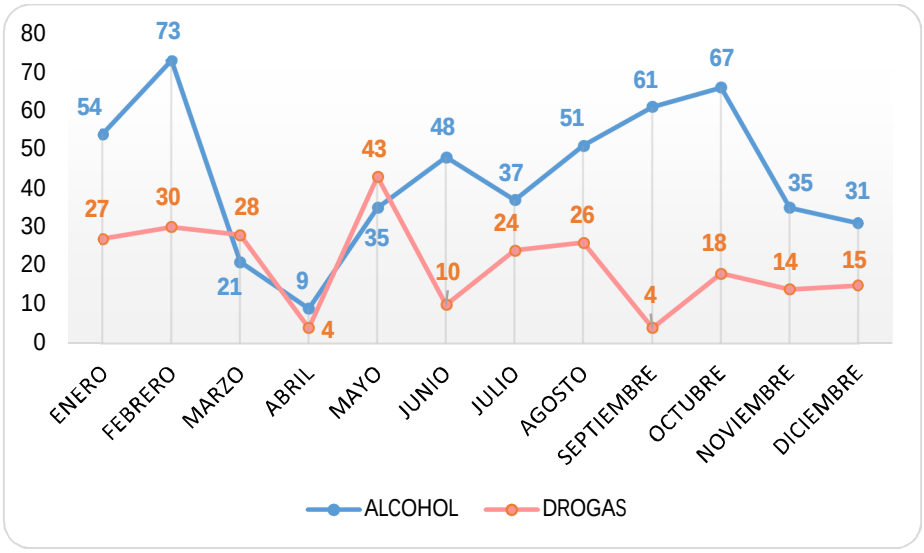


Source: Adapted from Marcos Ortiz (2023)

presents the monthly distribution of positive results. Non-uniform variation is observed due to the restrictions applied and the shortage of drug testing at certain times. Positive results for alcohol exceeded those for other drugs during all months of the year except March and May. In April, there was a marked decrease in positive results for all substances, attributable to the mobility restrictions enacted during lockdown. An upturn was observed during the summer months. There was another decline in the last two months of the year following the introduction of a night-time curfew from 26 October, which had an impact on leisure activities. June and September saw a decrease in the number of positive drug results due to the shortage of supplies for the screening devices.

Local police officers initially identified 648 (84.60%) of these offences, while other security forces identified 35 (4.57%) offences. The remaining 83 (10.83%) offences were reported by citizens via the emergency telephone number (092 or 112), which underlines the relevance of the role of capable guardian or natural watchdog that any citizen can play in the field of road safety.

Figure 2. Positives for alcohol and other drugs by month.



Source: Adapted from Marcos Ortiz (2023)

We analysed the distribution of drivers who tested positive according to the different periods of mobility restriction (Table 3). During the period prior to the declaration of the state of emergency (between 1 January and 14 March), 146 (27.97%) tested positive for alcohol and 85 (34.98%) for other drugs. Between 15 March and 31 December, 376 (72.03%) tested positive for alcohol and 158 (65.02%) for other drugs. During the period from 21 June to 24 October, in which restrictive measures related to nightlife and hotel and catering capacity were enacted, 40.61% of positive breathalyser tests were obtained. The presence of drugs was also found during these weeks, specifically 28.40% of the total positives, which is the highest percentage among the different periods into which we have classified the pandemic months.

Table 3. Positive results for alcohol and other drugs and their relationship to the restriction measures enacted during the Covid-19 pandemic.

Period (2020)	Alcohol, n = 522 n (%)	Other drugs, n = 243 n (%)
Before the Covid-19 pandemic		
1 January to 14 March	146 (27.97)	85 (34.98)
During the Covid-19 pandemic		
15 March to 2 May	14 (2.68)	6 (2.47)
3 May to 20 June	72 (13.79)	48 (19.75)
21 June to 24 October	212 (40.61)	69 (28.40)
25 October to 31 December	78 (14.94)	35 (14.40)

With regard to the percentage of positive results in terms of the number of breathalyser tests carried out, the highest percentages were obtained in May (32.41%) and October (28.39%).

183 (23.89%) drivers (173 men and 10 women) were reported for serious infringements of the Organic Law for the Protection of Public Safety (LOPSC). In 39 of the cases, positive results were found for alcohol, 139 for other drugs and 3 for alcohol together with other drugs. Two subjects, who showed clear signs of driving under the

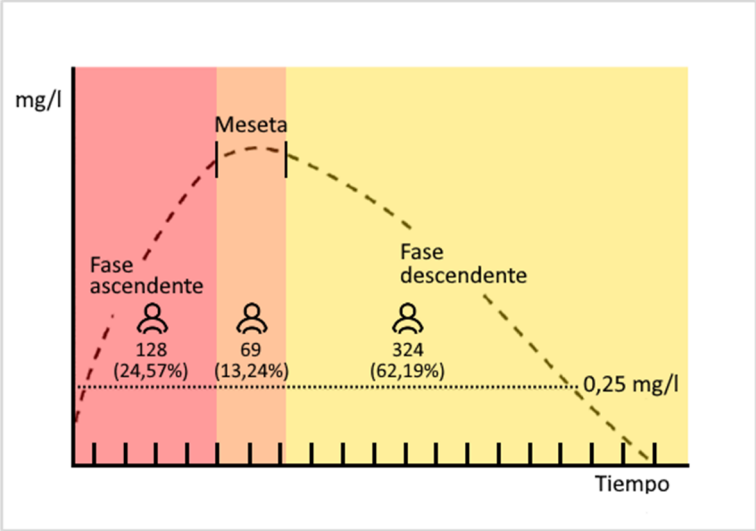
influence of alcohol or other drugs, refused to take the tests. In 129 cases (16.84%) the offences were due to the illegal use or possession of drugs; 38 (4.96%) to carrying prohibited weapons in the vehicle; 30 (3.92%) to disobedience or resistance to law enforcement officers; and 22 (2.87%) to other reasons sanctioned by the LOPSC.

3.1. Characteristics of drivers who tested positive for alcohol in exhaled air.

87.55% of the drivers are men (n=457) and 12.45% women (n=65) with ages ranging from 15 to 84 years. The most represented age group is 35 to 44 years old (27.01%), followed by 25 to 34 years old (23.75%), 45 to 54 years old (19.16%), 55 to 64 years old (14.18%), 15 to 24 years old (12.84%) and finally, the group of drivers aged 65 years and over (3.06%). The average alcohol concentration in exhaled air is 0.62 ± 0.01 (SD 0.21) mg/L, with values varying from 0.22 to 1.41 mg/L. In 46.17% of the cases, the blood alcohol level was above 0.60 mg/L. For men, the most frequent rates were above 0.60 mg/L (47.05% of all men). In contrast, among women, rates between 0.40 and 0.60 mg/L (49.23% of all women) stood out.

From the variables related to the rates obtained in the first and second breathalyser tests, it was possible to determine at which stage of the BAC curve drivers were when intercepted by traffic officers (Figure 3). The data indicates that 24.57% of drivers were in the rising phase, 13.24% in the equilibrium phase (Grehant plateau) and 62.19% in the falling phase.

Figure 3. Number of drivers with positive results and their stage of the BAC curve.



Source: Adapted from Marcos Ortiz (2023)

Among the offences related to positive results for alcohol, 316 (60.54%) were prosecuted under administrative sanctions and 206 (39.46%) were investigated under criminal law.

The city centre accounted for 82.57% of the total number of alcohol positives, while the remaining 17.43% were distributed in the outskirts among the smaller population centres. A relatively low incidence of alcohol-related offences was observed during the mornings (4.79%), increasing during the evenings (31.42%) and with the highest values (63.79%) during the early mornings (Table 4). The highest number of positive results was

found during weekends and public holidays (60.92%). The working period was marked by a low presence of offences in the mornings (0.96%), with a notable increase in the evenings (18.01%) and early mornings (20.11%). However, during weekends and public holidays there was a slight increase in positives during the mornings (3.83%), a decrease during the evenings (13.41%) and a significant increase during the early mornings (43.68).

Table 4. Distribution of positive breathalyser tests according to time period and day of the week.

Period	Working day, n=204 n (%)	Weekend/public holiday n=318 n (%)	Total, n=522 n (%)
Morning (7:00 am to 3:59 pm)	5 (0.96)	20 (3.83)	25 (4.79)
Evening (4:00 pm to 10:59 pm)	94 (18.01)	70 (13.41)	164 (31.42)
Early morning (11:00 pm to 6:59 am)	105 (20.11)	228 (43.68)	333 (63.79)

Table 5 presents the statistically significant relationships found between the variable "alcohol positive" and other variables. We found a statistically significant association between the positive result for alcohol in the driver and the existence of traffic accidents, the sex and age of the driver, the day of the week, the time of day, the nucleus of action, the LOPSC offence and the impact of Covid-19 lockdown.

Table 5. Statistically significant associations using the χ^2 test obtained for the variables "positive for alcohol" and "positive for other drugs".

	Positive for alcohol			**Positive for other drugs**		
Variables	**χ^2**	**Df**	**Significance**	**χ^2**	**Df**	**Significance**
Branch of the legal system	89.856	1	P < 0.001	116.081	1	P < 0.001
Sex (driver)	10.584	1	P = 0.001	12.018	1	P < 0.001
Age (driver)	69.966	15	P < 0.001	67.050	5	P < 0.001
Age and positive for cannabis (THC)	-	-	-	58.262	5	P < 0.001
Age and positive for cocaine	-	-	-	43.587	5	P < 0.001
Time band	156.324	2	P < 0.001	152.978	2	P < 0.001
Day of the week	75.387	6	P < 0.001	69.897	6	P < 0.001
Population centre	65.941	4	P < 0.001	65.691	4	P < 0.001
LOPSC infringement	224.461	1	P < 0.001	233.595	1	P < 0.001
Road accident	26.650	1	P < 0.001	-	-	-
Impact of Covid-19 lockdown	3.166	1	P = 0.048	3.449	1	P = 0.041

Source: Adapted from Marcos Ortiz (2023)

There is a direct association between the BAC level and road crashes ($P < 0.001$), since in 70.27% of accidents where the driver tested positive, the BAC level exceeded 0.60 mg/L, a percentage that increased to 90.54% for BAC levels above 0.40 mg/L. In relation to sex ($P = 0.001$) and age of the driver ($P < 0.001$), a higher prevalence is found in men (87.55%) compared to women (12.45%), especially in the 25–54 age group (69.92%). A significant association was found between "alcohol positive" and the day of the week ($P < 0.001$) and the time of day ($P < 0.001$). A higher frequency of positives is observed on public holidays and weekends (60.92%), as well as in the early morning hours (63.79%).

There is a statistically significant association between the period of time in which

there was or was not lockdown and the results obtained in the breathalyser tests. Of the 3,279 alcohol quantification tests carried out in the non-lockdown months, 13.02% were positive. In contrast, 401 tests were carried out during the lockdown period and 23.44% of them were positive.

3.2. Characteristics of drivers who tested positive for other drugs detected in oral fluid.

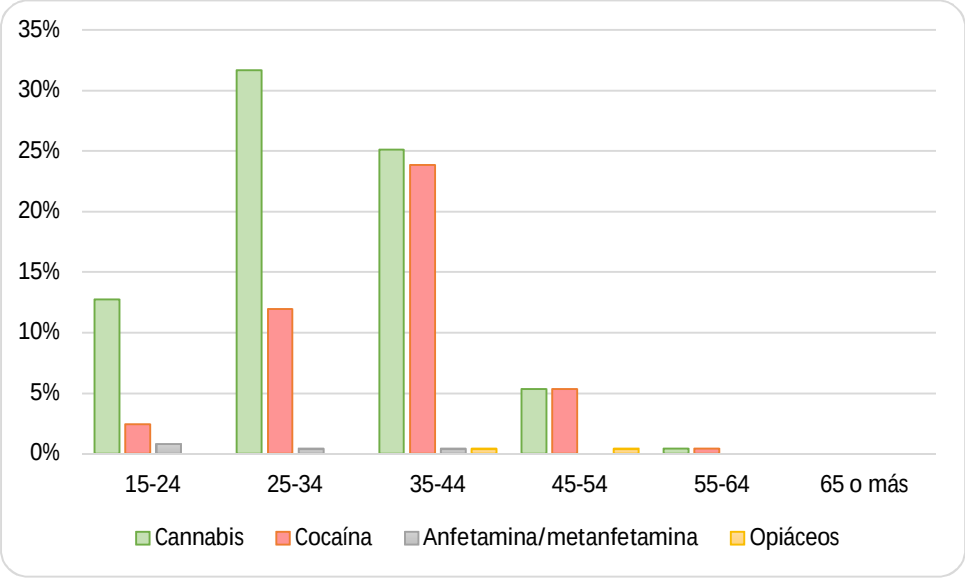
Toxicological tests on oral fluid samples revealed that 243 drivers, 232 (95.47%) men and 11 (4.53%) women, had one or more drugs other than alcohol in their system. The age of drivers ranged from 19 to 55 years, with the 25–44 age group being the most prevalent (76.13%), followed by the 15–24 age group (13.17%) and the 45–54 age group (10.29%). However, only one positive case (0.41%) was reported in the 55–64 age category, and no cases were reported for those aged 65 years and older. In the central area of the city, 143 (58.85%) positive results were detected, while 100 (41.15%) were observed in the outskirts.

The most common drugs were cannabis and cocaine, found in 183 (75.31%) and 107 (44.03%) drivers (n=243), respectively. Cannabis was found as the sole substance in 134 (55.14%) individuals and in 46 (18.93%) in combination with cocaine. This drug was found in 57 (23.46%) subjects. In addition, other combinations of substances were recorded in 6 (2.47%) drivers. Opiates and amphetamine/methamphetamine were identified less frequently, on only 2 (0.82%) and 4 (1.65%) occasions, respectively. According to their legal repercussion, 236 (97.12%) offences related to positive drug tests in oral fluids were prosecuted in the administrative sanctioning area, which contrasts with the low number of offences investigated in the criminal area, only 7 (2.88%).

Figure 4 shows the distribution of the substances found according to the different age groups into which we have categorised our sample. Cannabis is prevalent in the 25–34 age group (31.69%), while cocaine is more common in the 35–44 age group (23.87%). In the four cases where amphetamine compounds were found, two individuals were between 15 and 24 years old, one between 25 and 34 years old and one between 35 and 44 years old. As for opiates, the two localised cases involved drivers between 35 and 44 years of age.

According to the temporal analysis, 77.78% of the positive results for drugs were obtained during the evening, 16.46% during the early morning and 5.76% in the morning. During weekday evenings, 125 (51.44%) positives for cannabis and 55 (22.63%) for cocaine were documented. In contrast, on weekend or public holiday evenings, 29 (11.93%) positive cases were observed for cannabis and 20 (8.23%) for cocaine. During the early morning hours of weekends and public holidays, more positive cases were recorded for cannabis (7.82%) than for cocaine (4.94%). However, during early weekday mornings, cocaine (4.12%) showed a higher prevalence than cannabis (1.65%). Mornings were the time band with the lowest number of positive cases for any drug and, during weekends and holidays, cocaine predominated (3.29%).

Figure 4. Distribution of positive results according to substance identified and age group.



Source: Adapted from Marcos Ortiz (2023)

We found a statistically significant association (Table 5) between the "drug positive result" and the sex variable ($P < 0.001$) and age of the driver ($P < 0.001$), with a higher prevalence observed in men (94.47%) compared to women (4.53%), as well as in those aged between 25 and 44 years (76.13%). An association between age and the type of substance found is also evident, with cannabis ($P < 0.001$) being more prevalent in the 25–34 age group (42.08%), while cocaine ($P < 0.001$) is more common in the 35–44 age group (54.21%).

A significant association was also observed between the "drug positive" variable and the time band ($P < 0.001$) and the day of the week($P < 0.001$), with the highest incidence of positive cases found in the evening (77.78%), especially during the working week.

In relation to the "positive for drugs" variable and the legal repercussion ($P < 0.001$), it was found that the majority of these offences were reported administratively (97.12%).

In addition, a significant association is identified between the "drug positive" variable and the implementation of lockdown measures during the pandemic ($P = 0.041$). In this context, during the non-lockdown months, 30.19% of drivers tested were positive, while during the lockdown period, this figure rose to 38.57%.

4. DISCUSSION

This study was conducted in the city of Santander during 2020, conditioned by the Covid-19 pandemic and the restriction and lockdown measures adopted. This fact allows us to compare the results obtained according to time periods in which the mobility limitation was different.

During the first two and a half months, the activity developed normally. A total of 1,705 breathalyser and 95 saliva drug tests were carried out, with 146 (8.56%) positive for alcohol and 85 (89.47%) positive for other drugs. On 15 March, a state of emergency

was declared to deal with the health crisis, the situation was radically transformed and the restrictive measures implemented had a varying impact on people's mobility and thus on road safety. This led to a significant drop in the number of alcohol (1,975) and drug tests (180) in the following nine and a half months after the start of the pandemic.

The curfew decreed involved the absolute restriction of mobility on the roads 24 hours a day, except in exceptional situations. In this context, testing for psychoactive substances was almost entirely reduced and limited to the most serious situations (obvious signs of influence on driving or road accidents). In this regard, during the period between 15 March and the beginning of May, 30 breathalyser tests and 8 drug tests were carried out, with 14 (46.67%) and 6 (75.00%) positive, respectively. There is a clear decrease in the number of these offences compared to those recorded before the lockdown, in line with a lower traffic intensity. Similarly, Andres-Pueyo and Redondo (2021) note the considerable decrease in driving-related offences during lockdown (up to 80%), probably in association with the drop in road traffic (Redondo, *et al*, 2020). From an environmental perspective, this situation may have been a decisive factor in the radical decline of certain crimes (Stickle and Felson, 2020), in this case road offences. It is clear that the preventive measures implemented because of the Covid-19 pandemic affected social and interpersonal relationships, a major component in the genesis of crime, according to different criminological theories. Contingency that may have hindered the confluence in the same space and time of motivated potential offenders, suitable victims and the absence of effective protectors, the three necessary elements that, according to the theory of everyday activities, must converge for crime to increase (Redondo and Garrido, 2023).

From 2 May onwards, an increase in population mobility was observed as a result of the easing of the measures implemented. The number of tests performed and the number of positives increased. As a result, 134 alcohol tests were carried out up to 20 June, 72 (53.73%) of which were positive, and 52 saliva drug tests were carried out, 48 of which were positive (92.31%).

Although health measures were eased during the summer, some restrictions remained in place for hospitality establishments and in particular for nightlife. The latter is closely linked to road safety, due to the importance of alcohol consumption in this context.

Subsequently, new restrictions were implemented as of 26 October due to a new spike in positive coronavirus cases, which led to the adoption of a new state of emergency, including a night curfew between 11:00 pm and 6:00 am, a measure that would continue until the end of the study.

It is undeniable that the restrictions affected the lives of the population and therefore had an impact on road safety. However, a change in citizens' behaviour was also observed as a result of the restrictions imposed on hospitality and nightlife establishments. This made access to alcoholic beverages difficult at certain times, either because people could not leave their homes during lockdown or because they were not able to visit bars, restaurants, etc., or even because of the complete closure of nightlife. In this context, many people purchased alcoholic beverages in other types of licensed outlets than those operating during business hours (such as convenience stores) and consumed them at home and even on public roads, despite the fact that this constituted an administrative offence. Article 23.1 of Cantabria's Act 5/1997, of 6 October, on

Prevention, Assistance and Social Inclusion in Drug Addictions, establishes the prohibition of the *"sale and supply of any type of alcoholic beverages, free or not, through establishments of any kind, with the exception of establishments authorised for consumption and convenience stores, during night-time hours, understood as those between 10 pm and 8 am the following day.*"

In this scenario, on an avenue located in the central area of the city, close to the border with the outskirts, there was a petrol station with a shop that met the legal requirements to be considered a "convenience store". Article 15 of Act 1/2002, of 26 February, on Commerce in Cantabria defines convenience stores as "*those which, with a useful surface area for display and sale to the public of no more than 500 square metres, remain open to the public at least eighteen hours a day and distribute their offer, in a similar way, among books, newspapers and magazines, food items, records, videos, toys, gifts and miscellaneous items."* This made it possible for the establishment to sell alcoholic beverages between 10 pm and 8 am the following day, a circumstance that generated a "call effect" among some citizens who, during the restrictions, drove a vehicle to purchase alcoholic beverages. In our study, we counted 25 road violations related to the presence of psychoactive substances on this road, 24 of which occurred during the most critical periods of lockdown and between 10:00 pm and 8:00 am.

In our opinion, it is a paradox that in an environment where the sale of alcoholic beverages is prohibited at night, the sale of alcoholic beverages is allowed in an urban petrol station. Considering the criminological theories related to opportunity, this represents a clear risk to road safety, since most customers wishing to purchase alcoholic beverages for consumption in the evening are likely to come to the petrol station in their vehicles. This creates an opportunity for drinking and driving offences. In this sense, it is important not to underestimate the significant role that opportunity plays in the genesis of crime, as it allows us to understand criminal acts more fully and to obtain additional information on patterns and trends. As suggested by Wortley and Townsley (2017), criminal behaviour, like many other deviant behaviours, is influenced by the immediate environment in which it occurs, as this perspective is based on the assumption that all behaviour results from an interaction between the person and the situation. The distribution of crime in time and space is not random; those who commit crimes act according to their own goals, preferences and life routines. Crime varies from place to place and street to street, and can peak at different times of the day, days of the week and weeks of the year. The aim of the analysis is to identify and describe these crime patterns.

In this context, it is relevant to mention the ten sub-principles of criminal opportunity proposed by Felson and Clarke (1998), some of which are worth contrasting with what was observed in the study for these patterns and trends: "opportunities play a role in causing all crime; criminal opportunities are highly specific; criminal opportunities are concentrated in time and space; criminal opportunities depend on the movements of everyday activity; one crime creates opportunities for another; some products offer more tempting criminal opportunities; social and technological changes produce new criminal opportunities; crime can be prevented by reducing opportunities; reducing opportunities does not usually displace crime; a targeted reduction of opportunities can produce a broader decline in crime." We will proceed to the analysis of some of these sub-principles.

a) "Opportunity plays a role in the causation of all crime". During the COVID-19 pandemic, the closure of licensed drinking establishments led to a clear criminal

motivation by allowing the purchase of alcoholic beverages at an urban gas station during the night.

b) "Criminal opportunities are highly specific". Opportunity to commit crimes should be assessed in specific categories and diminishing opportunities should also be specifically addressed. In this case, we are confronted with a very specific criminal opportunity, which requires concrete measures to eliminate it in our study sample.

c) "Criminal opportunities are concentrated in time and space". Our study shows that crime patterns and trends are concentrated both in time (between 10 pm and 8 am) and space (on a specific road in the city). The convenience store located in the gas station becomes a "crime generator" and a "crime lure", attracting people who initially would not have visited there, but who do so due to the circumstances.

d) "Criminal opportunities depend on the movements of everyday activity". Criminals often look for opportunities to commit crimes at the lowest possible risk. The 10 pm to 6 am time band coincides with the nightlife period and has fewer people and less surveillance on the roads, creating opportunities for crime.

e) "One crime creates opportunities for another". Once a crime is committed, the offender may be involved in other crimes unexpectedly. For example, drink-driving can increase the likelihood of committing other offences, such as driving without a licence, reckless driving, dangerous challenges with other drivers, evading or fleeing a police checkpoint, refusal to take tests for alcohol or other drugs, and even disobedience, resistance or assault on authority.

f) "Crime can be prevented by reducing opportunities". In this regard, public authorities have a responsibility to take measures to minimise opportunities for crime. In the case under discussion, an effective way to eliminate criminal opportunities would be to reform the regulation allowing the sale of alcohol in convenience stores located in petrol stations at night. This is a preventive measure that would help to reduce this type of crime.

In our analysis of 766 actions, we observed that 84.60% of the offences were detected by the local police, who have the direct capacity to prevent and control road safety in urban areas. The remaining actions (15.40%) were the result of citizen action (10.83%) and other security forces (4.57%), which also acted as road safety watchdogs. Social control theorists maintain that people have a natural tendency towards delinquency or deviant behaviour, but are constrained or inhibited by a series of social controls (e.g. Gottfredson & Hirschi, 1990; Hirschi, 1969). It was to be expected that most road policing (89.17%) would be carried out through formal social control mechanisms (police, private security services, etc.). However, in the field of road safety, informal social control, exercised by other actors to prevent, impede or cooperate in investigation and control, must also be considered as very important. In our study we counted the actions related to cooperation in the detection and investigation of road offences by other road users (10.83%), without being able to quantify other actions related to the deterrence or avoidance of this type of offences by friends, relatives of the potential offender, waiters in a bar serving alcohol, etc. In this sense, Eck complemented the routine activities theory (Cohen & Felson, 1979), where crime occurs when a motivated offender, a suitable target (victim or property), and the absence of an effective guardian to protect that target

converge in the same space and time, differentiating between the elements that constitute necessary conditions for committing the crime and those that, known as controlling factors, have the capacity to prevent it. It is important to underline the relevance of the role of the guardian capable of preventing crime in the field of road safety. This role can be played not only by traffic officers or members of other police forces (formal social control), but also by any individual who, in their daily routine, contributes to protecting road safety (informal social control).

Among the positives reported, 67.10% of the drivers showed alcohol as the only substance, 30.68% other drugs and 1.04% a combination of alcohol and other substances. In addition, 1.17% of the sample refused to take the toxicological analysis, although all of them were driving a motor vehicle or moped and exhibited outward signs of being under the influence of psychoactive substances, thus incurring the offence of Art. 383 of the Spanish Criminal Code (CP) (refusal to submit to legally established tests). The number of cases with positive results for alcohol is 2.2 times higher than those for drugs, a figure very similar to the data provided by the DGT in 2020 (State Prosecutor's Office, 2023), where administrative proceedings for alcohol (37,116) were twice as high as those for drugs (18,498). However, it is possible that our drug figures are under-represented, as according to police protocol drivers were tested for alcohol in all cases and were only tested for drugs in specific situations (following direct observation of drug use, the presence of external signs or other indications suggesting possible drug use). We should also consider that during the months of June and September there was a shortage of drug testing kits, which limited the number of controls. This circumstance is also mentioned in the Memoria de la Fiscalía General del Estado de 2023 (2023 Report of the State Prosecutor's Office), which highlights a 27% percentage increase in the number of alcohol controls carried out by the Agrupación de Tráfico de la Guardia Civil (Guardia Civil Traffic Unit; ATGC) in 2022 compared to the previous year, resulting in a 51% increase in alcohol-related administrative sanctioning proceedings. In contrast, the opposite phenomenon occurred with drug testing, with the number of drug tests performed dropping to 47% and the number of positive tests to 51%. However, "*this reduction seems to be due to a shortage of material resources rather than to the consequences of a pandemic that has already been overcome, considering that it did not affect the high volume of drug tests carried out in 2021,*" (State Prosecutor's Office, 2023).

In our study, 89.95% of positive drivers were men, compared to 10.05% women. In the specific case of alcohol (87.55% men and 12.45% women) the percentages are in line with data from the EDAP 2021 study (87.88% men and 12.12% women) (DGT, 2022). Regarding other drugs (95.47% men and 4.53% women) there is a high prevalence of positive results in men, which differs from other studies such as EDAP 2021 (82.07% men and 17.93% women), perhaps due to the restrictions of the study (drug testing was not randomised).

In the specific context of alcohol (n=522), the majority of drivers who tested positive had very high levels (above 0.50 mg/L). This is surprising because these are drivers on whom deterrence and road awareness seem to have no effect and who drive without worrying about high alcohol consumption. In addition, 29 drivers re-offended twice and 2 drivers re-offended three times.

As far as substances other than alcohol (n=243) are concerned, cannabis (75.31%) and cocaine (44.03%) were the most frequent, amounting to 23.89% and 13.97%

respectively of the total number of tests carried out. Other different drugs, such as amphetamine/methamphetamine (1.65%) and opiates (0.83%), were much less common. In contrast to alcohol, the majority of offences related to other substances (97.12%) were sanctioned administratively. This reflects the limited criminal response for drugs other than alcohol, with a large imbalance between administrative offences (237) and criminal offences (6). This situation is partly justified by the typical requirements of the offence of Art. 379.2 CP, which requires proof of the influence of toxic drugs, narcotics or psychotropic substances on the individual's faculties while driving, a condition that goes beyond the simple presence of these substances in the organism, a criterion that would suffice for administrative criminalisation. Therefore, the difficulty lies in proving such influence in criminal proceedings, unlike what is typified for alcohol, which would be sufficient to constitute the offence of exceeding the objective rate of Art. 379.2, second paragraph CP. Scientific evidence reveals that, considering the toxicokinetics of alcohol and the correlation between the concentration of alcohol in exhaled air and in blood, the higher the rate, the greater the impairment of the subject's faculties. However, such theses applied to alcohol are not per se transferable to other drugs, where the scientific premises differ from alcohol (State Prosecutor's Office, 2019). This can lead to a low willingness to prosecute from the beginning of the police intervention, except in less frequent situations where the influence of drugs is evident. The above confirms the concern already expressed by the Public Prosecutor for Road Safety Coordination "*to the judicial traffic police with instructions for the preparation of reports for offences of driving under the influence of toxic drugs, narcotics and psychotropic substances of Art. 379.2 CP.*" In this instruction, it already pointed out that "*from this statistical data it can be deduced that there is a wide and growing administrative sanctioning prosecution of the drugs/driving binomial and a very limited or almost non-existent criminal prosecution out of step with the growing consumption of toxic substances in road traffic.*" However, the referral of the aforementioned official letter established general guidelines for action by standardising the proceedings or reports of external signs of drug use and the criteria for referral to criminal proceedings which, together with the increasing specific training of agents, have contributed to the gradual growth of the criminal investigation of these events.

From a criminological perspective, a strong relationship is established between delinquency, social deviance and the risk-taking behaviour of these drivers in the area of road safety. In our study we observed a significant connection between the presence of psychoactive substances in drivers and violations of the LOPSC. Approximately one in four offending drivers (23.89%) was reported for both offences: illicit drug use or possession (16.84%), mainly cannabis (14.23%) and cocaine (2.35%). Administrative offences were also recorded for carrying prohibited weapons (4.96%) and for disobedience or resistance to traffic officers in the exercise of their duties (3.92%).

A relationship is also observed between the presence of alcohol and drugs in the driver and the existence of previous complaints as a consequence of committing an offence under the LOPSC. 31.11% of the drivers in the study (n=733) had previously been reported by the local police between 2009 and 2019 for infringing any of the rules set out in the LOPSC (29.33% men and 1.77% women). More than half of these drivers (52.13%) had already accumulated two or more different complaints. The most common offence on the record is the illicit use or possession of drugs (23.06% of the total sample). In addition, at least 11.73% of the drivers in the sample had previously been reported for positive breathalyser tests, both in criminal and administrative proceedings.

In terms of the location of testing, 74.94% of alcohol and other drug-related offences occurred in the city centre, while 25.06% occurred in the outskirts. When we analyse this data according to the type of psychoactive substance and the reason for the offence, we find that, in the case of alcohol, 82.57% of the actions took place on roads in the city centre, and 17.43% in the outskirts. In contrast, the percentages were more balanced for the other drugs: 58.85% in the central area and 41.15% in less-populated areas.

A remarkable fact is the number of offences reported in a outskirt where a "cannabis association" was located. According to its publicity, this association was created for "*therapeutic and non-profit purposes, with consumption shared among the members inside the premises, controlling the quantities supplied and always under optional support.*" However, the Santander Magistrate's Court No. 5 ordered the temporary closure of the premises and the suspension of its activities at the end of 2020, which was subsequently ratified (Order of the Provincial Court of Cantabria 66/2021, of 17 February). In reality, this association is operated with a hidden activity of cultivation and production of cannabis involving the sale and distribution of narcotic substances, mainly marijuana and hashish. This circumstance was a clear area of concentration of criminal opportunities, also for certain administrative offences and offences against road safety.

We are aware of some limitations of the study related to the methodology used in police operations. The first is the random nature of preventive controls. In addition, there are many substances or combinations of substances that can be consumed and that can affect driving. However, many of them are not included in toxicological tests, such as substances for therapeutic use. Finally, as a limitation of the study, we must also include the context of the pandemic itself, during which there was also a shortage of toxic detection devices.

5. CONCLUSIONS

After analysing our results, we found two distinct profiles. One was a male driver (87.55%) between 25 and 44 years of age. These drivers tend to drive in the city centre, especially on weekends between 11 pm and 7 am. They have BAC levels above 0.60 mg/l in 47.05% of cases and are generally in the downward phase of the BAC curve. Infringements are sanctioned both administratively (60%) and criminally (40%).

The second profile corresponds to a driver who uses other drugs, mostly men (95.47%) aged between 25 and 44. These drivers drive both in the city centre (58.85%) and on the outskirts (41.15%) throughout the week, mainly between 7 pm and 12 am. The most frequent substances are cannabis (75.31%) and cocaine (44.03%). The 25–34 age group shows a higher incidence of cannabis use, while cocaine use is more prevalent in the 35–44 age group. Furthermore, it is quite common for these drivers to be involved in administrative offences in contravention of the LOPSC (58.19%).

In terms of how mobility restrictions influenced the population's consumption habits, it was found that during the months when there was no lockdown, 13.02% of alcohol tests and 30.19% of drug tests were positive, while in the period of lockdown the percentages rose to 23.44% and 38.57%, respectively.

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