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Changes in Online Psychoactive Substance Trade via Telegram during the COVID-19 Pandemic

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Abstract
Background: In this article, we present an evaluation of online psychoactive substance trade via Telegram, a free encrypted social media messenger service. The evaluation took place during the COVID-19 pandemic, which allowed us to monitor the effects of the spring 2020 lockdown in the Netherlands on substance trade via Telegram. ***Objective:*** The objective of this study was to evaluate whether changes in psychoactive substance trade on Telegram markets in the Netherlands can be observed during the COVID-19 pandemic. ***Results:*** Between December 2, 2019, and June 29, 2020, a total of 70,226 posts appeared in two analyzed Telegram groups. A total of 5,643 posts were psychoactive substance related. Based on the analyzed posts, Telegram is mostly a '"sellers" market as only a minority of the posts (6.3%) could be identified as a request for a substance. The proportion of posts related to specific substances varied between the periods before, during, and after the lockdown. The proportion of posts on the stimulants ecstasy, cocaine, and amphetamine was lower during the lockdown than before and after. For psychedelics – ketamine, lysergic acid diethylamide (LSD), and 2,5-dimethoxy-4-bromophenethylamine (2C-B) – and other substances, there was a relative increase in the number of posts during the lockdown, which was maintained after the lockdown. ***Conclusions:*** Telegram analysis shows that in the Netherlands, online psychoactive substance trade may have been affected during the COVID-19 pandemic. The direction of this effect was different for different classes of substances.

Introduction

In this article, we present an evaluation of online psychoactive substance trade via Telegram, a free encrypted cloud-based social media messenger service established in 2013 [1]. Because Telegram messages are end-to-end encrypted and can even be set to self-destruct, Telegram has become increasingly popular internationally to arrange deals regarding illegal products including drugs [2].

In the Netherlands, one way to monitor the illegal drug market is via the Drugs Information and Monitoring System (DIMS). Users can submit a drug sample at a drug checking service for chemical analysis. Information

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regarding date of purchase, what substance the sample has been sold as, price, and whether it is bought offline or online is registered [3–5]. In 2019, a small but increasing number of users submitting samples at one of the drug checking services mentioned Telegram when they were asked where they had bought the sample. In most cases, it concerned tablets sold as ecstasy. After a quick exploration, we noted that several types of illegal drugs are offered on a daily basis on different Telegram markets in the Netherlands. Therefore, we wanted to investigate whether monitoring these markets could be a valuable addition to our current monitoring system. Main advantages could be that changes in supply of several types of substances are revealed in "real time" and that markets appear nationally oriented in contrast to the international darknet markets.

The developments around the COVID-19 pandemic in Europe in the first quarter of 2020 made the monitoring of online illegal drug markets such as via Telegram especially urgent. Besides the enormous and devastating impact COVID-19 has made on all directly or indirectly struck by the virus, the EMCDDA reports that in relation to drug markets, an increasing number of drug users may have turned to online methods to source drugs rather than buying from street dealers to cope with restrictions introduced by governments [6]. A mixed picture has emerged regarding the observed changes to how drugs are being bought in various EU countries: via darknet markets, surface web shops, and mobile apps such as Telegram [6]. Given the recency of the developments, extensive research is still lacking, but a preliminary analysis of a darknet cannabis market has provided evidence of increased sales activity [6, 7].

On March 16, 2020, a so-called intelligent lockdown, with somewhat less strict measures than the lockdowns in some other European countries, took effect in the Netherlands as a result of the COVID-19 pandemic. Since we were already monitoring a few markets on Telegram when this lockdown became effective, this event allowed us to see if any changes in psychoactive substance trade would be reflected in the Telegram markets as well.

Materials and Methods

As of December 2019, we subscribed to 3 of the larger Dutch language Telegram market groups that appeared when we used the search term "drugs" in Telegram search engines. We decided not to disclose the names of these groups in this article to ensure discreet handling of the publicly available data. However, the names of the groups may be requested from the first author on reasonable grounds. After subscription to a Telegram group or market, we could read all posts placed in this group from the date of subscription onward. In addition, the Telegram desktop client software provides the functionality to download all messages posted to the groups one has subscribed for and store all messages as hypertext markup language (html) files.

Hence, using the Telegram desktop client, on June 29th we exported the complete chat corpus of the market groups which we followed since December 2019. The chat corpora were stored as html files, which we imported in the R statistical computing software environment. In R, we extracted relevant data of the html-based chat corpora and stored these data as a dataset for further analysis. Relevant data besides the post itself included its publication date and the Telegram group in which the post appeared.

In a parallel process, we created a small database containing different key words or phrases we wanted to search for in the Telegram posts, such as common (street) names for >300 different substances (scheduled, common new psychoactive substances or research chemicals, and pharmaceuticals), words related to whether the posts contained information from someone trying to sell or buy drugs, and words related to COVID-19. For our various online and offline drug monitoring activities, the Trimbos Institute keeps records of commonly used formal and street names of substances. Hence, we used 5–19 key words for each of the common scheduled substances. A manual screening of a sample of the posts indicated that the key words we used match the words used in the posts to refer to substances. Using pattern matching, a functionality present in R, we evaluated whether any of the key words or phrases were present in any of the posts stored in our dataset. If so, the presence of the key word or phrase in the post was recorded in the dataset. After the pattern matching procedure was completed, we had a final working dataset with all posts, associated dates, the Telegram channel where the post was published, and information on the presence of any of our key words or phrases in each post. This final dataset was used for further analyses.

In order to compare changes between the months before the COVID-19 lockdown in spring 2020 in the Netherlands, we created an indicator variable based on the post dates. All posts before the start of the lockdown in the Netherlands (December 1, 2019–March 15, 2020) were coded as before, posts from between March 15 and June 1, 2020, were coded as during, and all posts between June 1, 2020, and June 29, 2020, were coded as after the lockdown. As one of the market groups we monitored was suddenly discarded around March 7, 2020, for unknown reasons, this group was kept out of the analyses; hence, the presented analyses are based on the results of 2 Telegram markets.

For the analyses presented in the Results section, we used descriptive statistics tools from base R; the generalized mixed modeling was done using the lme4 package for R. In the generalized mixed modeling analyses, the lockdown phase "during" was the reference group (0). As all data were collected from an open and freely accessible anonymized online data source (Telegram), no informed consent could be collected. As no data were collected prospectively for the presented analyses and there were no participants subjected to research procedures, this study was exempted from medical ethics approval in the Netherlands.

Table 1. Counts and proportions of all collected Telegram posts related to different substances

Substance	*N*	Proportion
MDMA/ecstasy	3,043	0.0433
Cocaine	2,112	0.0301
Amphetamine	992	0.0141
LSD	547	0.0078
Prescription medication	460	0.0066
Ketamine	397	0.0057
GHB	263	0.0037
2C-B	127	0.0018
Methamphetamine	109	0.0016
Heroin	57	0.0008
Other common NPS	37	0.0005
Methadone	13	0.0002

LSD, lysergic acid diethylamide; 2C-B, 2,5-dimethoxy-4-bromophenethylamine; NPS, new psychoactive substances.

Table 2. Counts and proportions of Telegram posts before, during, and after the lockdown in the Netherlands

Substances	Lockdown phase	*N*	Prop	SE
All substances	Before	3,252	0.0822	0.00138
All substances	During	1,571	0.0674	0.00164
All substances	After	820	0.1120	0.00368
Top 3 substances	Before	2,747	0.0694	0.00128
Top 3 substances	During	1,048	0.0449	0.00136
Top 3 substances	After	677	0.0923	0.00338
Psychedelics	Before	455	0.0115	0.000536
Psychedelics	During	368	0.0158	0.000816
Psychedelics	After	128	0.0175	0.00153
Other substances	Before	473	0.0120	0.000546
Other substances	During	512	0.0220	0.000960
Other substances	After	157	0.0214	0.00169

Results

Between December 2, 2019, and June 29, 2020, a total of 70,226 posts appeared in the 2 analyzed Telegram groups. From market #1, we have collected all 43,927 posts; from market #2, we have collected all 26,299 posts. As these 2 groups are apparently general purpose markets, only a minority of the posts in these 2 groups are drug related. Based on the number of matches with our key word database, a total of 5,643 posts were drug related: 496 (1.89%) in market #2 and 5,147 (11.7%) in market #1. Based on the analyzed posts, Telegram is mostly a "sellers" market as only a minority of the posts (6.3%) could be identified as a request for a substance or other illegal products.

A large number of different psychoactive substances are apparently being traded on these markets. MDMA/ecstasy is the most frequently traded drug; in total, 3,043 posts (4.3%) are related to MDMA/ecstasy. Cocaine (n = 2,112, 3.0%) and amphetamine (n = 992, 1.4%) are the second and third, respectively; all 3 of the most traded drugs are stimulants. Note that 1 post may mention more than 1 substance and that post is often reposted with the same or slightly adapted formulations. Table 1 presents the breakdown of the number of posts related to each substance. From the 70,226 posts in our dataset, 39,579 were posted before the start of the lockdown (March 16, 2020), 23,315 during the lockdown (March 15–June 1), and 7,332 after the lockdown in the Netherlands (Table 2).

What can be observed from Table 2 is that the proportion of all posts related to psychoactive substances varied between the periods before, during, and after the lockdown. For all substances together, and for the 3 most traded substances in the 2 Telegram groups (MDMA/ecstasy, cocaine, and amphetamines – all 3 are stimulants), the proportion of posts related to drugs was the lowest during the lockdown.

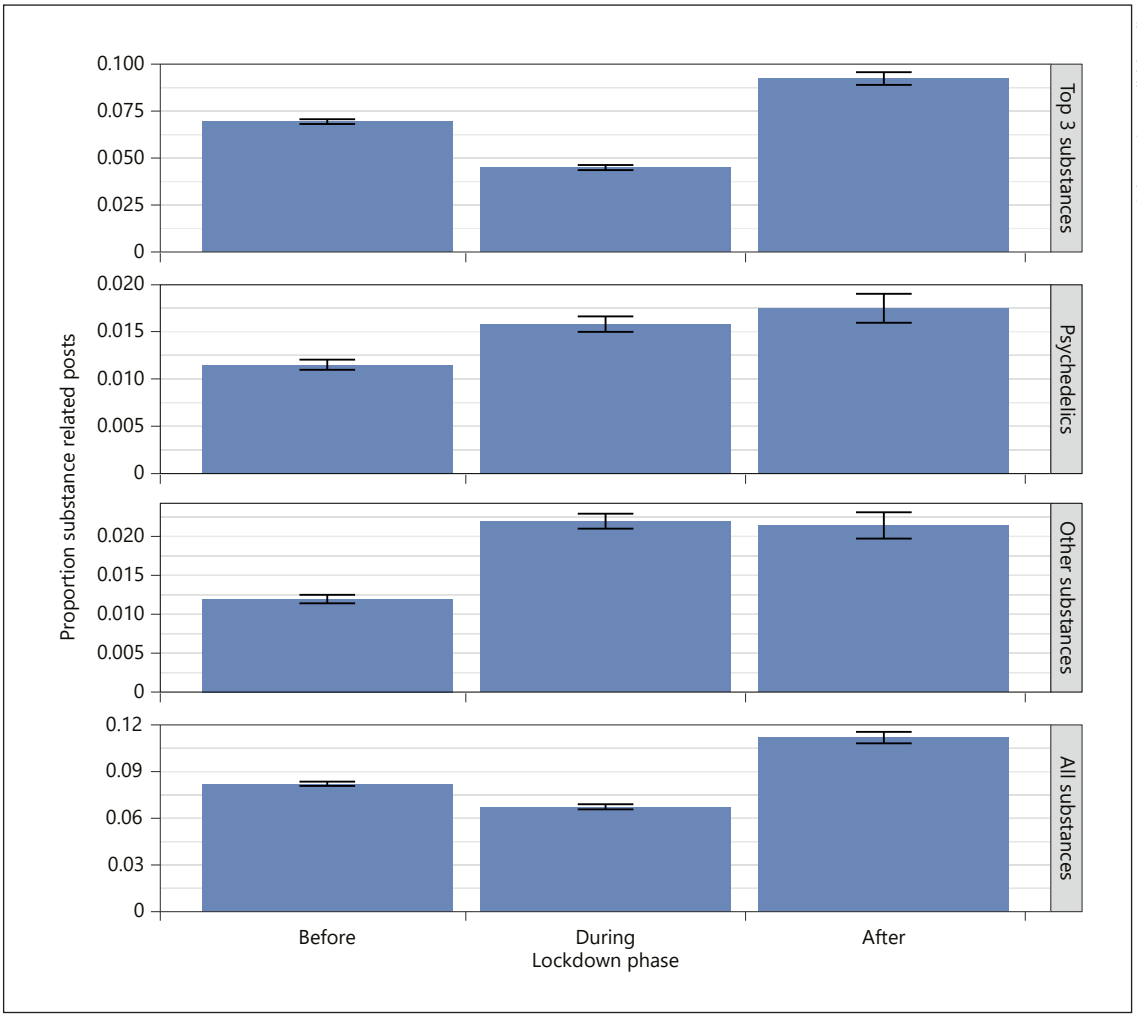
For the psychedelics – ketamine, lysergic acid diethylamide (LSD), and 2,5-dimethoxy-4-bromophenethylamine (2C-B) – and other psychoactive substances, a different pattern can be observed, where there is a relative increase in the number of posts related to these substances during the lockdown, and this increase is maintained after the lockdown. Statistical testing using generalized linear mixed modeling with a binomial link function, Telegram group as a random factor, lockdown phase as a fixed predictor, and whether a substance was mentioned in a post as the dependent statistically supported these observed patterns (Table 3). Figure 1 presents a graphical representation of the differences between the proportions of posts related to drugs before, during, and after the lockdown.

We have also evaluated whether around the lockdown traders referred to the COVID-19 pandemic in their posts. This appeared to the case in a very small minority of all posts. Before (n = 6) and after (n = 7) the lockdown, almost no referrals to the COVID-19 pandemic were found. During the lockdown, 112 posts (0.5%) mentioned COVID-19 pandemic-related terms.

Table 3. Generalized linear mixed modeling of differences in substance-related posts between lockdown phases

Substances	Lockdown phase	*B*	SE	*z*	*p* value
All substances	Before versus during	0.18	0.032	5.66	<0.0001
	After versus during	0.43	0.046	9.41	<0.0001
Top 3 substances	Before versus during	0.43	0.038	11.51	<0.0001
	After versus during	0.65	0.052	12.48	<0.0001
Psychedelics	Before versus during	−0.35	0.071	4.96	<0.0001
	After versus during	0.0022	0.104	0.021	0.98
Other substances	Before versus during	−0.64	0.064	9.88	<0.0001
	After versus during	−0.086	0.093	0.93	0.35

Lockdown phase "during" was the reference group (0) in the regression analyses.



Color version available online

Fig. 1. Proportions of posts related to substances before, during, and after the lockdown in the Netherlands.

Discussion

In this article, we presented an evaluation of online psychoactive substance trade via Telegram during the COVID-19 epidemic. These results show that in the Netherlands, drugs are being offered via multiple Telegram market channels during the COVID-19 pandemic. In the Netherlands, the most popular stimulant drug is ecstasy, followed by cocaine [8]. These 2 are also the drugs that are traded the most via Dutch Telegram markets.

Based on the groups we monitored, the COVID-19 pandemic appears to have had an impact on the trading behavior on Telegram. Especially, the psychoactive substances that historically have the strongest association with nightlife, clubbing, and dance events (ecstasy, cocaine, and amphetamine) were offered less frequently during the lockdown in the Netherlands. After discontinuation of the intelligent lockdown from June 1 onward, when some nightlife settings such as bars were reopened, the trading behavior in these substances was restored. For psychedelics, a rather different pattern was observed. This may be related to the hallucinogenic effects of this group of substances, making use of these substances less typically associated with clubs and bars. Psychedelics were traded relatively more often during the lockdown than before. For the drug market in the monitored groups as a whole, the pattern was similar to that of the 3 most popular substances; this may be due to the fact that the majority of drug posts mentioned ecstasy, cocaine, and amphetamine.

Based on an accumulating number of other reports on substance use and trading during the COVID-19 pandemic, the pattern observed in the presented Telegram analysis is generally comparable to what is observed [6] or expected to be found [9] elsewhere. According to a report by EMCDDA [6], the impact of the COVID-19 pandemic on the supply side of drug trading has been limited. Global restrictions on travel and other measures have had a temporary disruptive impact as these led to shortages for some drugs but not all. Seizure data from main entry points of cocaine to the EU indicate that the disruption to the supply of cocaine to the EU during the pandemic is limited. For cocaine and other stimulants such as ecstasy and amphetamines, a number of EU countries report a decrease in availability during spring 2020 [6].

Based on the amounts that are being offered, varying from single tablets or grams of powder to tens of tablets or grams of powder, social media such as Telegram are most likely used for the purchase of smaller amounts of drugs. This is somewhat different from darknet markets where also wholesale amounts of drugs are being offered. Telegram could be one of the intermediary options between darknet markets and street dealing which are valued by end users according to the work by Moyle et al. [2].

Strengths and Limitations

The results presented in this article should be interpreted in the light of a number of limitations. The Telegram markets we followed may not be representative for all Telegram markets that are used to exchange illegal products including drugs. Many posts are not unique. Some posts are identical or almost identical and are most likely repeated (repost) over days on different markets. In most posts, more than 1 substance is being offered. To what extent the products offered on Telegram are actually being traded and how this trading takes place cannot be derived from these data. However, we do know from the DIMS data that there is a certain amount of drugs trade via Telegram [10]. With regard to data extractions, limitations were that drug prices could not automatically be extracted from the data and that messages that included videos could not be automatically scraped and incorporated in our database. MDMA and ecstasy are combined in the analyses as the chemical is the same; however, the form and mode of administration (MDMA: powder or crystal; ecstasy: tablet) differ. In the Netherlands, the tablet form is more common.

Conclusion

Based on our findings and given the limitations, we conclude that Telegram is currently not suitable as a representative data source on its own to monitor changes in psychoactive substance trade on the Dutch drug market. However, it does give a "real-time" insight on which drugs are being offered online via social media in the Netherlands. In combination with other monitoring instruments available in the Netherlands, it helps inform policy makers about how drug supply has been affected during the COVID-19 pandemic and how the direction of this effect was different for different classes of substances.

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Statement of Ethics

No data were collected prospectively for the presented analyses, and none of the participants was subjected to research procedures. Therefore, this study was exempted from medical ethics approval in the Netherlands.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All authors contributed to the conception of the work. D.G., L.S., and L.S.R. created the key word database, and M.B. extracted the Telegram data and imported data in R. M.B. prepared the analyses; all authors evaluated, interpreted, and optimized the analyses. M.B. wrote the first draft of the manuscript, D.G., L.S., and L.S.R. commented on the draft and/or rewrote sections of the draft. All authors approved the final version of the manuscript.

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