



COVID-19's effect on Domestic Violence in Sweden during the first 6 months of 2020.

A deeper look into gender differences, weekly crime rates, and the relationship between the victim and offender.

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ABSTRACT: The COVID-19 pandemic has brought about several restrictions throughout society which has limited people's outdoor activities and forced individuals to stay home. These circumstances have possibly had an impact on the prevalence of domestic violence and other types of assault. This paper uses police crime data from the first six months of 2020 to analyse if any changes in domestic violence can be attributed to the implementation of COVID-19 restrictions in Sweden. Using the LUPP method, developed by The Swedish Council for Crime Prevention (BRÅ), this paper investigates weekly changes in crime compared to the same period in 2019 while additionally studying the prevalence of different types of relationships between the victim and offender. Results indicate that partner violence for men has doubled in relation to all assault crimes, and that partner violence for women has also increased substantially, accounting for 46 % of total assault crimes in the observed period. Abuse by family members, other acquaintances, and unknown persons have seemingly gone down in 2020, compared to the same period in 2019. A concluding regression analysis reveals weak to moderate correlations between changes in domestic violence- and non-domestic violence crimes and COVID-19 restrictions, even when changes in seasonality is accounted for. While the increase in domestic violence crimes does not directly coincide with the emergence of COVID-19, results indicate that the implemented restrictions have played an important role in maintaining heightened levels throughout the observed period. Future research is advised to continue testing for correlations to COVID-19 restrictions, while also considering other variables which could be related to domestic violence, such as increased alcohol consumption at home, family isolation, and economic stress.

Keywords: Abuse, Assault, COVID-19, Domestic Violence, Oxford Stringency Index, Restrictions. (Total word count: 7868)

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INTRODUCTION

Government legislators across the world have been forced to implement strict rules and regulations throughout all domains of society in order to reduce the death-toll caused by the COVID-19 pandemic. Temporary lockdowns, stay-at-home orders, as well as curfews are all utilized across the world in an attempt to decrease the spread of the virus by limiting interactions between people (Neuman, 2020). Changing the ways humans behave and interact with one another has had countless unforeseen effects throughout society, and recent studies across the world have pointed out that overall crime, and especially street-crime, seems to be decreasing due to social distancing (Ashby, 2020; Bump, 2020; Farrell & Tilley, 2020; Mohler, et al., 2020). While similar effects have also been measured in Sweden (Gerell, et al., 2020), the change in some specific crime types, such as domestic violence and intimate partner violence, do not necessarily follow the same trend. Various news sources and women's rights organizations across Sweden and the world have been especially outspoken regarding this issue since the start of the pandemic, warning the public and the government that an increase in domestic violence crimes due to restrictions against COVID-19 would be happening (Sveriges Radio, 2020; SVT, 2020; FN.se, 2020; Townsend, 2020). The reasoning behind this is that increased time spent at home due to COVID-19 restrictions amplifies the number of interactions between potential victims and offenders, especially as these crimes are usually committed by partners and family members living in the same household (Ashby, 2020; Mohler, et al., 2020). Depending on the intensity of enforced rules of social distancing and stay-home orders, some researchers suggest that these specific crime types are bound to increase, especially during episodes of government-ordered lockdowns (Eisner & Nivette, 2020; Mohler et al., 2020). Additionally, researchers warn that the constant requirement to stay at home where the perpetrator also resides reduces the victims' ability to seek help, which is already a difficult step to take in the first place (Boserup, et al., 2020). Given this reasoning there exists a substantial risk that domestic violence, and especially partner violence, has increased due to the imposed social distancing restrictions.

In Sweden however, while stronger restrictions have been implemented recently through the newly passed pandemic-law in March of 2021, no strict measures such as lockdowns or stay-at-home orders have been put into place since the beginning of the pandemic (Folkhälsomyndigheten, 2020h; Swedish Government, 2021). Instead, the main strategy of defence against the virus has been promoting social distancing and responsibility through recommendations and guidelines laid out by the Public Health Authority (ibid.). These circumstances differentiate Sweden from the rest of the world in how the government has chosen to handle the situation, allowing its citizens to retain their independence and freedom under a shared responsibility and trust that people will follow the guidelines in the face of an emerging pandemic. Due to the way Sweden has handled the situation, the effects which COVID-19 restrictions has potentially had on domestic violence remains interesting to investigate, especially from a criminological perspective. With this background in mind it is therefore the purpose of this paper to examine the potential effect which COVID-19 restrictions has had on the level of domestic violence in Sweden with regards to both men and women. This will be done by using a measurement known as the COVID-19 Government Stringency Index, which is a measure of restrictions implemented by any government on a scale from 0 to 100. This measurement is continuously updated and developed by researchers from the University of Oxford in association with the Global Change Data Lab (Oxford, 2021). For the purposes of this paper, the stringency index will serve as a baseline to represent the severity of restrictions taken by the Swedish authorities.

AIM AND RESEARCH QUESTIONS

The aim of this paper is to investigate how COVID-19 restrictions have affected domestic violence for both men and women during the first six months of 2020, and to study these patterns while observing the relationship between the victim and the offender. More specifically, the first issue of this paper is to investigate if there are any observable differences in victimization when it comes to the relationships between the victim and the offender (Partner, Family/relatives, Other/Acquaintances, or Unknown). The second issue of this paper is to analyse this data more deeply and see if any changes in victimization coincide with the emergence of COVID-19 in Sweden. The final issue of this paper will conclude with investigating if there are any significant correlations between domestic violence related crime and the stringency index developed by Oxford University. The research questions are therefore as follows;

- Compared to the same period in 2019, are there changes in victimization of domestic violence assaults for men and women during the first six months of 2020?
- Do the changes in victimization coincide with the emergence of COVID-19?
- Are COVID-19 restrictions correlated to domestic violence crime, as measured by the Stringency Index from Oxford University?

Definitions and limitations

Before moving on to previous research it is necessary to define the concepts used in this paper, along with some limitations. Firstly, the Swedish police define partner violence as abuse occurring between individuals in an intimate relationship who are, or have been, married, cohabiting, separated, or have children in common (BRÅ, 2021). The definition of domestic violence (Brott i nära relation) additionally extends the relationship to also include parents and other family members or relatives. Secondly, it is important to define what type of abuse is occurring within this context. While some countries might only recognize physical or sexual abuse as such, many different forms of abuse are generally recognized and included in Sweden. These are all forms of physical-, psychological-, sexual-, material- and/or economic abuse which occurs privately between individuals linked by an intimate relationship (ibid.). Depending on various circumstances, when registering a crime within the crime statistics, the Swedish police might recognize the victimization as a specific crime-type known as spousal abuse (fridskränkning), or aggravated spousal abuse (grov kvinnofridskränkning), which is different from the crime-data used in this paper. These crime-types are specifically reserved as crimes committed by male offenders with a female victim, meaning that there are no comparisons to the male population. While these specific crime types should also be considered in future research, the data which will be used in this paper will only include instances of *physical abuse* (assault/aggravated assault). Additionally, due to the limitations of this paper, sexual abuse, as well as abuse against children within a domestic violence setting, will not be studied. In order to understand the differences between the various types of relationships in which physical abuse can take place, the definitions which are used by BRÅ (2021) are presented below. In this paper, assaults by a partner/family will be considered domestic violence crime, while assaults by Other/Unknown will be considered non-domestic violence crime.

- *Currently/previously intimate partners* means that the individuals involved are, or have been, married, boyfriend/girlfriend, cohabiting or separated while intimately involved with each other.
- *Family/relative* means that the involved individuals are, or have been, related through adoption, family ties, blood ties, or became family members through the marriage of a relative.
- *Other acquaintance* means that they are, or have been, acquainted with one another through a different type of relationship than mentioned above, such as a friendship, being colleagues, teacher-student, doctor-patient, or another type of relationship which involves a higher degree of familiarity other than simply knowing each other's name and appearance.
- *Unknown with no relationship* means that the victim and the perpetrator are not familiar with each other through any of the definitions/relations given above. The following crime codes thereafter separate the incidents into different crime codes by looking at the degree of the assault (aggravated or non-aggravated), as well as if the incident took place outdoors or indoors. For example, intimate partner violence where women were victimized will therefore be represented by the crime codes 9357, 9365, 9359 and 9367 (see *Table 1* and *Table 2* in the appendix).

THEORY AND PREVIOUS RESEARCH

The most relevant theory behind the predictions of Eisner & Nivette (2020) and Mohler et al., (2020) is that of Routine Activity Theory by Cohen & Felson (1979), stating that changes in routine activities can both facilitate or obstruct certain crime from taking place. As mentioned previously, rules which enforce social distancing and limit outdoors movement might result in increased time spent at home, leading to more opportunities for crimes committed in the home to manifest, such as intimate partner violence and other forms of domestic violence (DV). Conversely, due to restrictions in outdoors movement, interactions with potentially violent strangers and other acquaintances is expected to decrease due to these changes, resulting in less outdoor crime taking place, which has already been measured across the world (Ashby, 2020; Bump, 2020; Campedelli et al., 2020; Farrell & Tilley, 2020; Gerell, et al., 2020; Mohler et al., 2020). With this theoretical foundation in mind, research regarding COVID-19's effects on crime as well as other domains of society is currently a hot topic being monitored closely by academics throughout various disciplines. Several recent studies in the United States have observed a recurrent association between stay-at-home orders and DV related calls for law-enforcement across multiple states (Bullinger, et al., 2020; Campedelli, et al., 2020; Leslie & Wilson, 2020; Mohler, et al., 2020; Nix & Richards, 2021).

The data observed by Leslie & Wilson (2020) showed that the increase in DV calls for service began immediately within a week after COVID-19 restrictions were implemented in Chicago and remained at their largest levels during the first five weeks before subsiding slightly towards the end of May. In this time period, calls for service to the police increased by 7.5 %, and households without a previous history of DV stood out noticeably within the data. Authors speculate that these results might indicate that new DV cases are appearing, perhaps due to increased unemployment, economic stress and family isolation (ibid.) Interestingly, while Bullinger et al., (2020) also found that DV calls for service in Chicago increased during the first weeks of restrictions, a decrease in official reports and arrests was surprisingly observed, showing a reduction by 8.7 and 26.3 percent respectively in each measurement. Multiple explanations as to why underreporting and fewer arrests took place was explored by

the authors. Firstly, victims might choose to not pursue filing an official report against the perpetrator perhaps due to a serious change in their perception of immediate or long term safety (ibid.). This might further be complicated due to the earlier mentioned economic distress and general instability many individuals are experiencing due to COVID-19, potentially forcing victims to remain dependent on the financial support from the offenders, making them unwilling or unable to pursue legal action for any experienced abuse. Secondly, interactions with civilians in the eyes of police might be perceived as more dangerous over time as the pandemic spreads, making officers less likely to engage in activities potentially requiring physical altercations with suspected offenders such as conducting arrests (ibid.). Lastly, while the authors did not find any evidence pointing towards police being less likely to be dispatched to DV calls for service, it is important to keep in mind that officers can choose to arrest and file reports at their own discretion (ibid.). Bullinger et al., (2020) concluded that while social distancing efforts resulted in an increase in DV related calls in Chicago, this was nevertheless offset by a subsequent lack of police reports and arrests, creating a clear disparity between calls for assistance and official incident reports.

Similarly, in the study by Mohler et al., (2020), calls for service in relation to DV in Indianapolis and Los Angeles were increased in the period between 16 - 23 March, precisely when schools and restaurants were initially closed. This increase was sustained even some time afterwards before dropping off, showing an unclear but potential connection between COVID-19 restrictions and a temporary surge in DV (ibid.). Piquero et al. (2020) observed similar results when examining the effects of a lockdown issued in Dallas, Texas, showing a spike in DV for the first two weeks of the lockdown, followed by an equally sharp decrease. However, due to DV being on the rise before the data was observed it remained difficult to draw any tangible conclusions from the observations (ibid.).

Published in late March of 2020, Weichselbaum & Li (2020) examined overall crime in multiple large cities in the US, where further analysis revealed that DV had mostly remained stable or even decreased since the start of the pandemic, although not as significantly as other crimes. Studies such as this, which have specifically sought out to examine the immediate effects of lockdowns on DV, show results which are clearly contradicting the earlier mentioned hypothesis of Eisner & Nivette (2020) and Mohler et al., (2020). However, as pointed out by Payne et al., (2020b) in a more recently released article, an apparent issue regarding research which was published during the early onset of lockdowns and stay-at-home orders is that researchers are often looking at a relatively short time series, only discovering minor immediate effects. Looking at daily offence counts for a single month or two remains problematic as it does not necessarily take into account trends following the observed time series or seasonal variations in crime which have been known to exist for decades (ibid.). Leslie & Wilson (2020) similarly observed that not taking seasonality into account when conducting their study on DV in the US would have overestimated their own evaluations by a factor of two, leading to exaggerated results.

In response to studies such as these, researchers have also attempted to control for seasonality while observing correlations between COVID-19 restrictions and DV. Based on data from 2016 to 2020, Ashby (2020) used an advanced seasonal auto-regressive forecasting method in order to compare predicted crime rates with recorded crime rates during the start of social distancing measures (March) in 16 large cities in the US. Ashby (2020) observed that there was no significant deviation in overall crime during this timeframe which could be directly attributed to COVID-19 restrictions, especially as cities with extremely similar restrictions at times showed significant variations in reported crime levels. However, Ashby (2020) raised

several issues regarding DV data, as it was concluded that the situation victims find themselves in due to lockdowns limits their ability to seek help and report the offender, meaning that underreporting is certainly occurring. Any results consisting of data on shorter time periods should therefore be analysed with caution, as it is possible that only serious assaults would be noticed during this time, while minor assaults would be significantly underreported. Also notable, using the same forecasting method, Payne et al., (2020a) observed that breaches in domestic violence orders in Queensland, Australia, remained unchanged during the first two months of the pandemic. This was concluded by looking at previous register data from 2014 to 2020, asserting that breaches in domestic violence orders simply remained within the confidence intervals, and did not deviate from the predicted forecast in any significant way even after the implementation of COVID-19 restrictions.

However, most recently in regards to previous research, Piquero et al., (2021) published an extensive systematic review and meta-analysis of domestic violence during COVID-19 in February of 2021. A total of 18 eligible studies, 12 in the US and six in other countries, provided 37 various estimations regarding the impact of COVID-19 restrictions on several dimensions of DV. From these estimations, it could be gathered that a majority, 29 of them, reported an increase in DV, which meant that domestic violence had on average increased by 7.9 % across all observed locations, and 8.1 % if only looking at the US. These results are derived from a wide range of data, including official report data, emergency hotline registries, calls for service and various health records, all after the start of the pandemic (ibid.). While this evidence is deemed strong by the authors, it remained unclear as to which factors most contributed to this increase, as correlations are difficult to calculate. The researchers suspect that lockdowns and stay-at-home orders were of importance, but also that the impact of more specific variables, such as unemployment, economic stress, increased alcohol consumption at home, decreased financial stability and family isolation are of importance to investigate further, especially when combined (ibid.). Additionally, the researchers raised concerns that the pandemic had resulted in separating victims of DV from potential safety networks, such as friends, family members, educators, neighbours and other individuals capable of reporting signs of abuse, or otherwise helping victims escape their dangerous environments. Several studies raised concerns that stringent restrictions and lockdowns which limit movement outdoors have potentially cut off possibilities of help-seeking, escape, and ways of coping for victims (ibid.). As other researchers have pointed out, seeking help is further complicated due to perceived COVID-19 related health-risks from being placed at an emergency shelter or encountering other people out of necessity (Nix & Richards, 2020; Gosangi, et al., 2021). Under these circumstances, offenders are therefore given more opportunities to control, coerce, and harm victims behind closed doors, where no one can intervene (Piquero et al., 2021; Bradbury-Jones & Isham, 2020; Roesch, et al., 2020; Boserup, et al., 2020).

In summary, several previous studies seem to suggest that COVID-19 has influenced the levels of domestic violence, but whether these effects can be directly attributed to any implemented restrictions remains inconclusive in some cases, as other variables might be of more significant importance. Additional variables such as unemployment, family isolation, economic stress and alcohol consumption at home require deeper contemplation within future research (Halford, et al., 2020; Leslie & Wilson, 2020; Payne et al., 2020a; Payne et al., 2020b; Piquero et al., 2021). With this previous research in mind this study will continue to present the ethical considerations of this paper.

ETHICAL CONSIDERATIONS

Ethical considerations are always important to evaluate for multiple reasons when conducting any type of research, as there always exists an obligation for researchers to make sure that no unnecessary harm is done to any individuals or groups taking part both directly and indirectly in the project (Bryman, 2014). While this is usually the case for qualitative studies gathering sensitive information, even quantitative studies can become harmful in various ways if caution is not taken, especially regarding the subject of domestic violence. Considering the materials used, no specific ethical approval was needed, as it does not deal directly with personal data or sensitive information. This project only includes aggregate statistical data, where police reported crimes registered within each Swedish municipality on a daily basis have been converted into total weekly crime across Sweden.

However, the sensitivity of the subject at hand is important to consider and reflect upon throughout the entire project, as word choice and formulations need to be monitored closely in order to avoid raising unnecessary negative feelings for any potential readers who have been victimized in a setting which is described within the study (Bryman, 2014; Forsberg & Wengström, 2016). If there was a need to deal with personal and sensitive data multiple criteria would need to be fulfilled, such as the standard research requirements of utilization, information, consent and confidentiality (Bryman, 2014). Researchers must make sure that participants are not exposed in any way, by making them identifiable upon publication or subjecting the participant to negative emotions during information gathering. While these ethical considerations are not of concern within this paper, there are other issues which need to be addressed. With regards to how mainstream media portrays offenders and victims of domestic violence it is important to consider that researchers and readers might be at risk of associating certain attributes or terms with certain genders. For example, the words “attacker” and “abuser” might reflexively be associated with the male gender, and other terms, such as “survivor”, with female victims. As this paper will include aggregate data on both genders as potential victims, such language will therefore be avoided, opting to use more neutral terms such as “offender” and “victim”. The terms of abuse and assault, describing the crime committed, will also be utilized interchangeably for this reason, avoiding “charged” words. As the only author of this paper it is also important to consider one's own pre-understanding of the issues discussed within the project, as well as how this might influence the subsequent analysis and understanding of the subject.

Additionally, when contributing to the existing literature of domestic violence in relation to COVID-19 it is also vital to consider the possibilities of increased stigmatization of certain issues upon publication, especially as public opinion and media might be influenced by any results. An example of this could be to use any parts of this paper to criticize the Swedish government or the Swedish strategy in relation to the handling of the COVID-19 pandemic, which continues to be a hot topic even at the publication of this paper. With these issues in mind it is hereby declared that the author does not hold any special interests within this subject, and that this project does not seek to evaluate the effectiveness of the Swedish COVID-19 strategy or to place blame upon anyone for any potential effects this has had on the levels of domestic violence. This project simply aims to analyse the available statistics in relation to domestic violence and the research questions raised in this paper.

METHODS AND MATERIALS

The data used in this paper derives directly from the Swedish police authority of reported assaults from the first of January 2016 until 30 of June 2020 (week 26). While it was desirable to analyse the full data of 2020, the project was limited to what aggregate data was available, meaning that only the first 6 months of 2020 is included in this paper. The crime codes which are used in the data contain several useful components of information, describing the location of where the crime was committed (indoors/outdoors), the severity of the abuse (non-aggravated or aggravated assault), as well as information about the known relationship between the offender and the victim (intimate/partner, relative/family, acquaintance, or unknown). This degree of information is usually not available within crime statistics, but as of the first of January 2019 Sweden implemented several new crime-codes used specifically to monitor various forms of domestic violence and assaults (BRÅ, 2018; BRÅ, 2021). It is important to remember that while this data is useful for the purposes of this paper, the dark figure in domestic violence-related crime is typically considered to be high, and additionally that errors within statistics are not unusual (BRÅ, 2021). While mixed methods could alleviate the issue with dark figures, this paper will strictly be looking at the available data due to limitations in time and resources. Additionally, prior analysis of the data used in this paper made The Swedish Council for Crime Prevention (BRÅ) release several PM's and documents investigating specific changes observed around February of 2020. These effects are also seen to be prevalent in this paper, and will be discussed later. BRÅ (2020a, 2020b) showed that for domestic violence against women (by a partner), an unexpected and sharp increase was seen beginning in February and extending into March, resulting in an anomaly of 61% higher prevalence of DV cases in March of 2020 compared to March of 2019. Their analysis suggests that while this data is difficult to interpret, this increase is most likely not connected to the emerging pandemic, but instead an anomaly which needs further investigation (ibid.).

Additionally, composed by the Global Change Data Lab, in coordination with the University of Oxford, a project called the COVID-19 Government Stringency Index was used as a variable within this paper, describing the strictness of measures taken by the Swedish government in response to the pandemic (Oxford, 2021). By looking at nine variables, such as closing schools or workplaces, or restricting travels in various ways, a value of between 0 - 100 is set daily to represent the stringency of measures currently in place within the country. Each variable is scored between 0 and 3, 0 and 2, or 0 and 4 depending on the various levels of stringency which the measurement might achieve. For example, the variable "Closing public transportation" is measured from 0 - no requirements, 1 - recommended closing, and 2 - require closing, while the variable "Restrictions on gatherings" is measured at 0 - 4 depending on the number of individuals allowed to gather at one place (no restrictions, 1000+, 100-1000, 10-100, or <10) (ibid.). The value which was set for Sweden on a weekly basis can be seen below in *Table 3*, along with a short description of the restrictions which caused the score. In addition to these nine variables, testing policy, contact tracing, usage of face coverings, and vaccine policy are also considered in order to give a more representative value to the index. However, researchers responsible for the stringency index point out that this is in no way a rating of appropriateness or effectiveness of a country's response to the pandemic (ibid.).

Table 3. Interventions implemented in Sweden and stringency levels during the observed time frame (Week 1-26) in 2020 (Oxford, 2021).

Week (date)	Stringency level 0 - 100	Intervention/restriction description
11 (12/3)	27.27	Gatherings of > 500 people banned. (Folkhälsomyndigheten, 2020a)
11 (13/3)	27.27	Anyone with cold symptoms asked to stay home. (Folkhälsomyndigheten, 2020b)
12 (16/3)	27.27	Anyone over age 70 asked to minimize physical contact. (Folkhälsomyndigheten, 2020c)
12 (17/3)	35.19	High schools and universities to teach from distance. (Folkhälsomyndigheten, 2020d)
12 (19/3)	43.52	Anyone asked to refrain from unnecessary travels. (Folkhälsomyndigheten 2020e)
13 (24/3)	43.52	Restaurants, café and bars are mandated to limit crowding. (Folkhälsomyndigheten 2020f)
13 (27/3)	50.93	Gatherings of > 50 people banned. (Folkhälsomyndigheten 2020g)
14 (1/4)	59.26	General recommendations to businesses and associations to limit social interaction. Employers recommended to encourage work from home. Public transport is ordered to reduce crowding. (Folkhälsomyndigheten 2020h)
18 (29/4)	64.81	Pregnant women with health problems recommended to limit social contacts as much as possible. (Folkhälsomyndigheten 2020i)
26 (13/6)	59.26	Prime Minister Stefan Löfven announces that symptomless individuals may travel freely within Sweden (SVD, 2020)

LUPP

To analyse the data used in this paper a method called LUPP was utilized. This method is consistently used by Swedish Police and is considered a relatively basic analysis methodology developed by the Swedish National Council for Crime Prevention (BRÅ, 2001). This method uses crime statistics and data from previous years to calculate a median value of crime levels which is used to project a forecast of expected crime rates for the next year, along with a confidence interval (CI) which can be calculated at various levels. For example, to calculate the expected crime trends of 2020, researchers could look at the statistics from 2016 to 2019 and extract the median value from these years in order to create a projection for 2020 (ibid.). While this method is originally meant to be used on monthly crime rates, the choice was made to use this method while simultaneously converting the data into weekly crime measured in real time. This means that the crime data is based on the date- and week of registration, avoiding the issue of crimes being registered retrospectively. The confidence interval is calculated using the formula $\pm 1.96 * \text{SQRT}(n)$, attempting to reach a confidence interval of 95% in accordance with LUPP guidelines (ibid.). The value derived from this calculation gives a maximum and a minimum interval, allowing for a certain level of deviation from the projected crime levels which might be expected. Therefore, any weekly deviation that is

above or below this confidence interval might be of interest to analyse further, as it would show that the development of crime does not follow the expected projection. However, as previously mentioned, some of the crime codes used in the data were first implemented in 2019, meaning that data from previous years is not always available or compatible in order to fully utilize this method. In these instances, the analysis will instead consist of a yearly comparison between 2019 and 2020, where the confidence interval is calculated only using the data from 2019 as this is the only data available since the implementation of the new crime codes. Additionally, in some instances the statistics have been observed to be unstable and inconsistent especially during the years of 2016 and 2017. When this was observed, the median value was instead calculated using data from only 2018 and 2019 in order to avoid using faulty data. While this issue means that the resulting projections are less reliable, as they are only based on the two previous years of data, a comparison calculation showed that using the complete data from 2016 and 2017 resulted in multiple obvious errors and unrealistically inconsistent projections, especially as 0 crimes were reported for multiple weeks in a row during these years, meaning that the necessary solution was to exclude the faulty years. While LUPP guidelines also advise that using data from multiple years in the past increases the robustness of the prediction, changes to crime codes or additions of new ones can occur, changing the way crime-data is registered (BRÅ, 2001). Luckily, most of the data from 2018, 2019 and 2020 seemed complete for all crime types, nevertheless allowing for some level of LUPP analysis, or a comparison with the previous year with regards to COVID-19 appearing in week 11 of 2020. Simple bar charts will also serve to visually display some descriptive data allowing for some interesting comparisons between 2019 and 2020 during the same time period.

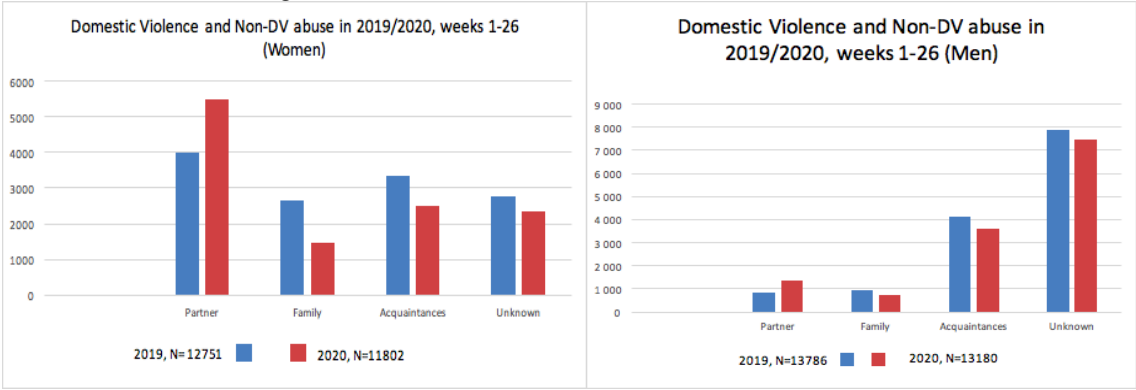
Regression analysis

Lastly, a concluding regression analysis conducted in SPSS will be used to establish if a correlation can be found between the total weekly crimes (from 2019-01-01 to 2020-06-28) and the stringency index variable which initiates at week 11 of 2020 as displayed earlier in *Table 3*. The dependent variable in the regression is the total weekly crimes for both genders, using all crime codes mentioned in this paper. The regression analysis was completed in three steps, checking for correlations between Total Violence (all abuse/assaults), Domestic Violence (Abuse by family/partner) and Non-Domestic Violence (abuse by acquaintance/unknown). Each category is compiled of all relevant abuse/assault cases from week 1 in 2019 to week 26 in 2020, with a total of 78 431 cases of physical assault. The domestic violence category consists of 63% partner violence and 37 % family violence, while the non-domestic violence category consists of 60% unknown- and 40% acquaintance violence. As previous research pointed out the importance of seasonality, the regression will also consider a variable of seasonality to see if there is a correlation between crime rates and changes in seasons (months). The seasonality is coded monthly between January and June, as the data which includes the outbreak of COVID-19 only stretches to week 26 in 2020, meaning that half of winter from 2019, as well as half of summer in 2020 is excluded. The coding for the months is dichotomous, where 1 indicates that the month is present, and 0 means that it is not present. Coding it in this way will show if changes in weekly crime follow the expected variations in seasonality. Additionally, using data from the start of 2019 will give the regression a more profound basis to detect if there are any significant changes in weekly crime beginning from week 11 of 2020 which could be attributed to the stringency index or the months included in the seasonality.

RESULTS

To address the research questions stated in the aim of this paper, an objective presentation of data will follow in the forms of charts, graphs and a regression table. These results are later elaborated upon in the discussion, where complete answers to the research questions are given.

Bar charts 1 & 2. Data of assaults committed by a Partner, Family member, Acquaintance, and Unknown person for women and men during the first 26 weeks of 2019 and 2020.

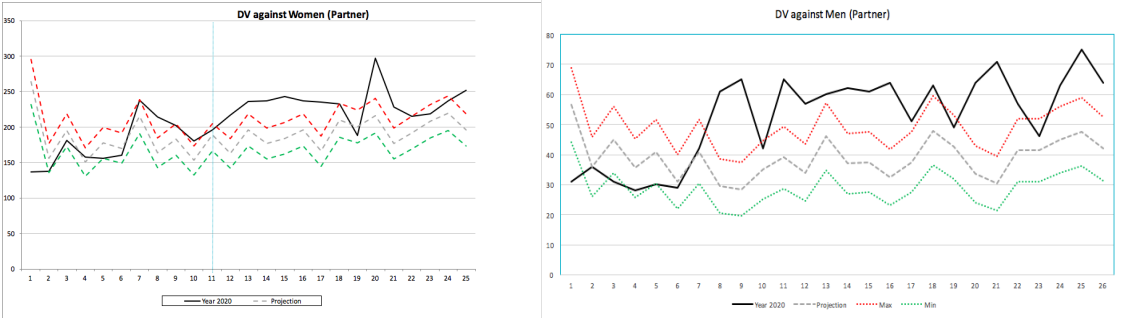


These bar charts display the total crimes regarding all assaults by all types of relationships for both women and men in the first 26 weeks of 2019 and 2020 respectively. Overall, the statistics make it quite clear that while women are most often victimized by partners, men are mostly victimized by unknown persons or acquaintances. By comparing the years 2019 and 2020 some interesting changes can be seen. For women, domestic violence by a partner increased by approximately 15% in relation to the total number of assault cases, from 3977 in 2019 (31% of all cases) to 5473 in 2020 (46% of all cases). For men, DV by a partner also increased substantially in relation to the total amount of crimes, surging from 5% to 10%. In numbers, this is equal to a doubling in the prevalence of this type of violence within the statistics, bringing a total of 1186 additional cases during this six month period, which is approximately 200 additional cases per month.

Domestic violence by a family member is the least occurring type of violence for both genders. For women, the prevalence of this type of abuse was almost halved in comparison with the previous year, decreasing from 20% to 12%. A much smaller decrease can be seen for men, from 965 cases to 746, which in proportion to the total amount of crimes is only a change of 1.5%. The prevalence regarding abuse by acquaintances looks similar for both genders, being approximately at 25 and 30 percent in 2019 and decreasing to 21 and 27 percent respectively. The biggest difference between men and women regarding the prevalence of these crime types lies in the abuse by Unknown category. For women, the prevalence of this crime type is the third least occurring, staying only at 20 - 21 percent both years, while for men however, a prevalence of 57-56 percent can be seen both years in relation to the total amount of abuse crime types. Overall, there were more cases of abuse in 2019 than in 2020 during this period, while the largest changes for both genders seem to have taken place in the category of domestic violence by a partner, where a substantial increase can be observed.

Domestic violence (Partner)

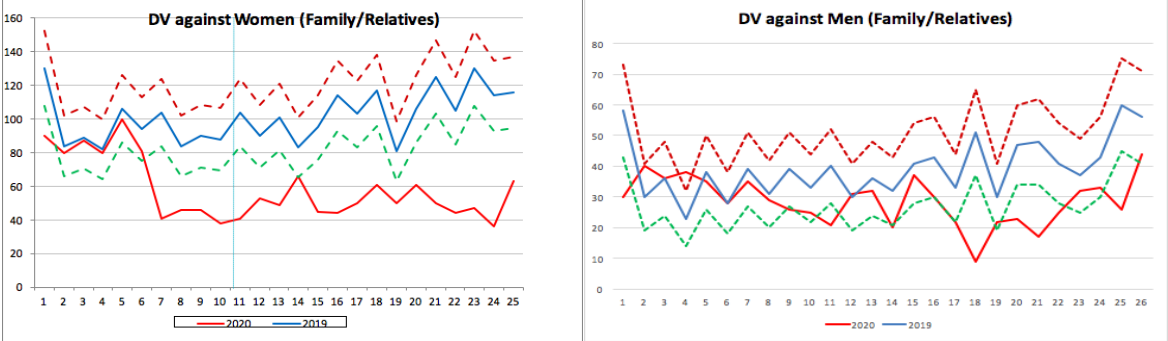
Graphs 1 & 2. Domestic violence by a partner for women and men during the first 26 weeks of 2020.



The graphs displayed above show victimization by domestic violence (by a partner) during the first 26 weeks of 2020 for both women and men. The total number of cases during this period were 5473 for women and 1367 for men. A projection of the forecasted domestic violence cases is also displayed using the LUPP method, which is calculated using data from the first 26 weeks of 2018 and 2019 (grey dotted line). Along with the projection, a confidence interval of 95% is displayed through the maximum and minimum lines represented in red and green respectively. The graphs display that the number of weekly cases is mostly staying very close to, and above, the maximum confidence interval outlined in red for both genders. Interestingly however, this increase is observed to take place even as early as week 7 for both genders, which is before COVID-19 restrictions were implemented in Sweden (week 11). Additionally, domestic violence cases for women remained higher than the projected line between week 12 and 18 before briefly dropping back down within the confidence interval and surging upwards again around week 20. For men, domestic violence cases seem to have been above the projection throughout the whole of week 7 to 26, only briefly dipping down below the maximum confidence interval projection a few times. Comparing the total number of cases, women are more exposed to this crime type in general, but some similarities can still be seen in the patterns, such as the sharp increase in week 7 along with the consistently higher number of cases than the expected projections for both genders.

Domestic violence (Family/Relatives)

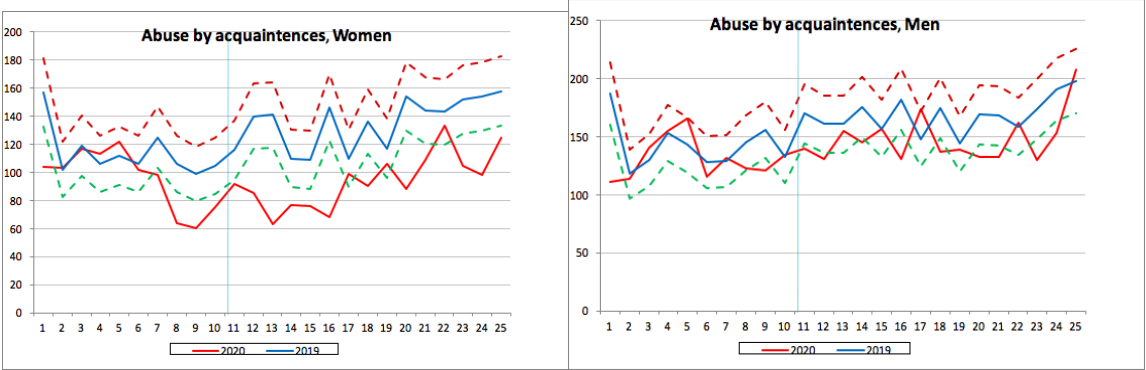
Graphs 3 & 4. Domestic violence by a family member/relative for women and men during the first 26 weeks of 2019 (blue) and 2020 (red).



The crime codes regarding this type of domestic violence were implemented in January of 2019, meaning that no reliable data from previous years is available to create a projection using the LUPP method. The confidence interval is therefore calculated only using the data from 2019 and a general comparison between the prevalence of cases from 2019 and 2020 can be analysed. The graphs show that crime rates for this type of abuse was higher overall in 2019 for both genders, as confirmed in the previous bar charts. The total number of cases in 2019 during this period was 2659 for women and 965 for men. In 2020, this decreased to 1496 for women and 746 for men during the same period. An interesting decline can be seen between week 5 and week 7 in 2020 for DV against women, followed by a relatively stable development throughout the rest of the period. Similarly for men, this crime type looks to have been stable throughout the 2020, only decreasing slightly during week 16-18 but quickly returning to regular levels thereafter. Most notable in these graphs is the overall change in domestic violence cases for women during this period compared to 2019, showing an overall decrease of about 44% in the total number of cases.

Assault by other acquaintances (Non-DV)

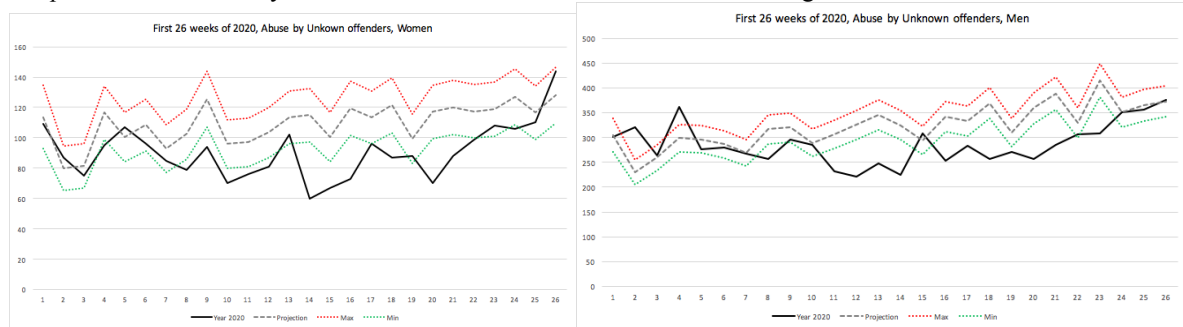
Graphs 5 & 6. Assault committed by an acquaintance for women and men during the first 26 weeks of 2019 and 2020.



The crime codes describing this scenario were also implemented in 2019, meaning that the LUPP method is not reliable. The confidence interval is calculated using only the data from 2019. The total number of cases in 2019 was 3335 for women and 4116 for men during this period. In 2020, these numbers were 2504 for women and 3732 for men. It can be seen again that the most notable difference here is the overall decrease in cases for women at 25%. A smaller decrease of 9% can also be seen for men. When it comes to the pattern of the weekly crimes 2020 seems to follow a similar trend for both genders in comparison to the previous year. Other than the dip in week 7 of 2020 for women, no other noteworthy deviations can be seen in the pattern.

Assault by unknown offenders (Non-DV)

Graphs 7 & 8. Assault by an unknown offender for women and men during the first 26 weeks of 2020.



As data was available from 2016 and forward due to no changes being made in the crime codes, a reliable LUPP projection could be calculated using statistics from all previous years. The total number of cases during the observed period was 2352 for women and 7446 for men. While the data shows that men are significantly more often assaulted by unknown offenders than women, the graphs show that abuse from unknown offenders has been mostly below the projected estimates after week 11 for both genders. However, similarly to previous graphs, the actual decrease in weekly cases bringing the line below the expected projection seems to occur around week 7, prior to COVID-19's spread in Sweden. Finally, for both genders, the data also showed a slight increase after week 25, returning to regular levels within the confidence intervals.

Results from regression analysis

In the table below it can be seen that the correlations are initially insignificant when testing total violence against the stringency index, as the p-value is .946. Only when adding seasonality into the regression in Model 2 can some interesting results be seen, as the R² increases from 0 to .436 and the results are now significant with a p-value of .012. With the insignificant results from Model 1 in mind it can be stated that seasonality is most likely an important predictor of weekly changes in data when it comes to assault-type crime. Domestic violence crime showed a significant correlation to the stringency index, but the results were only weak with an R² value of .205. The explanatory power increased only slightly to .261 when adding seasonality in Model 2. However, the constant remained positive in both models, showing that as the stringency index increases, so do these types of crimes. This is theoretically consistent with the suspicions of Eisner & Nivette (2020), indicating that DV crime increases with more rigorous restrictions. For non-DV, the regression initially shows a slightly significant result with a very low R² value of .042. This displays again that the stringency index is not able to achieve any real explanatory power by itself. However, adding the seasonality in Model 2 increases the explanatory power substantially to .545, along with increasing the significance level. This result indicates again that the data is most likely sensitive to changes in seasonality, and the results in this model are considered moderately strong by typical regression standards. The constant is shown to be negative in both models, indicating that these types of crime have decreased as the stringency index increased. Looking at the constants for DV and non-DV crime, it is clear that they run in opposite directions of each other. This might explain why there were no significant correlations between total violence and stringency index, as different assault crimes are affected in different ways by

restrictions. Furthermore, the regressions indicate that the results from all models are not likely to be random, as the p-values are shown to be significant, excluding the relevance of a null hypothesis within these results. Lastly, while it is not displayed in the table below, it can be mentioned that correlations between weekly crime levels and each individual month from January to June showed that non-DV crime began to increase in the warmer months of May and June, as would be expected with assaults by unknown persons or acquaintances.

Table 4. Summary of correlations within the regression analysis. While Model 1 only considers the correlation to the Stringency index, Model 2 results also include Seasonality, which consists of dummy variables for January, February, March, April, May and June which are not individually presented in the table. * = Significant at the .05-level. ** = Significant at the .005-level.

<i>Variables, Models, & Correlations.</i>	Total Violence (all assaults) N = 78431	Domestic Violence (Partner/Family) N = 25638	Non-Domestic Violence (Unknown/Other) N = 52793
<i>Model 1. (M1) Stringency Index (constant)</i>	. -.008	.453**	-.232*
<i>M1. R2</i>	.000	.205**	.054*
<i>Model 2. (M2) Stringency Index + Seasonality (constant)</i>	-.263*	.333*	-.473**
<i>M2. R2</i>	.436*	.261*	.545**

DISCUSSION

To address the first research question, it can be concluded that compared to 2019, several changes in victimization of domestic violence as well as other types of assaults can be seen. These changes are not only regarding the victims' relationship with the offender, as seen in the bar charts, but additionally extends to the development patterns over the observed period, as seen in the graphs. The most differentiating development when comparing men and women could be seen in assaults by a family member, where the prevalence of assaults decreased substantially for women, almost halving, while men's victimization remained relatively unchanged, only decreasing with 1.5 % in relation to all assaults. In comparison to 2019, the data from 2020 showed that the most notable change took place in the partner violence crime codes, where both men and women showed a significant increase in the prevalence of cases. The prevalence of men's victimization of partner violence almost doubled from 5% to 10% in relation to all assaults, while women's victimization by a partner in 2020 almost became half of total assaults at a prevalence of 46%, increasing by 15% overall compared to the same time period in 2019.

To answer the second research question, it can be concluded that the changes in victimization are seemingly not directly related to the emergence of COVID-19 restrictions. A recurring anomaly within the statistics was presented in several graphs around week 7 (February), which is a full month before COVID-19 restrictions were implemented in Sweden (week 11, March). While this anomaly within the data was briefly mentioned earlier in the analysis by The Swedish Council for Crime Prevention (BRÅ 2020a, 2020b), they had only observed these changes in relation to partner violence against women. According to the results seen above, partner violence against men also underwent a very similar increase of cases in the same period. Conversely, a sharp decrease was also noticed surrounding the same week in both assaults against women by other acquaintances and family/relatives, perhaps pointing to some unknown connection between the different types of assaults.

Lastly, the regression analysis revealed that weak to moderate correlations could be found with crime levels and the stringency index, even when controlling for seasonality. R² values of .261 and .545 in DV- and non-DV crime indicate that COVID-19 restrictions account for some of the explanatory power when it comes to weekly changes in these crimes. These results are consistent with what was mentioned in the previous research, as multiple other studies found some correlation between crime and COVID-19 restrictions, but concluded that other variables, such as alcohol consumption at home, stress, and family isolation, are most likely playing a bigger part in the issue (Halford et al., 2020; Leslie & Wilson, 2020; Payne et al., 2020a; Payne et al., 2020b; Piquero et al., 2021). The regression analysis additionally revealed significant and positive constants of .333 and .453 in both models investigating the correlation between DV crime and the stringency index, indicating that higher levels of DV crime came with increased restrictions. While COVID-19 restrictions did not directly cause an increase in domestic violence related crime, it can be concluded that increased restrictions had a role in maintaining higher levels of DV victimization.

To conclude the discussion several limitations which apply to the current paper need to be addressed. Firstly, the materials used in this study are based on crime report data, which could be considered problematic as it does not necessarily represent the true prevalence of domestic violence crimes in Sweden. Using other data sources such as self-report studies or data from calls for service could additionally complement the data and give a more representative and

reliable set of statistics to utilize for an analysis such as this. The issue of underreporting is important to keep in mind while analysing this data, especially as previous research has pointed out that help-seeking and discovery of this type of abuse is further complicated by the implementation of COVID-19 related restrictions (Boserup et al., 2020; Bradbury-Jones & Isham, 2020; Gosangi, et al., 2021; Piquero et al., 2021; Roesch et al., 2020). Secondly, using a time series shorter than the full year does not account for the complete seasonal crime changes, missing out on the whole of autumn and a large part of winter and summer. However, looking at a shorter time series could also be beneficial, as it facilitates the finding of immediate changes in crime, and in this instance, allows for a deeper look into the weekly changes, rather than monthly. While the development of domestic violence abuse by a partner is alarming when it comes to both men and women being victimized, it is important to keep in mind that these results are heavily dependent on the statistics from 2019 being relatively stable and representative as a comparative year. With the addition of the new crime codes in 2019 multiple issues are presented for researchers when it comes to utilizing the statistics in research, such as calculating projections using the LUPP method in this project. If the data from 2019 was somehow skewed by either underreporting or an abnormally high level of assaults then the results in this paper must be interpreted more carefully. It is with these issues in mind that the confidence intervals could better show when the results are truly worthy of interest. Lastly, the results are highly dependent upon the validity and reliability of the stringency index being representative of restrictions implemented in Sweden. The benefits of using this as a variable is that it allows for international comparisons in the future, as the stringency indexes of various countries are available through this project by the researchers from Oxford University.

CONCLUSION

In summary, domestic violence by a partner has increased substantially for both men and women in the first half year of 2020, while other types of assault have gone down. A deeper look into weekly changes in crime rates indicate that domestic violence crime was on the rise even before COVID-19 restrictions were implemented in Sweden. While the increase in DV crimes does not directly coincide with the emergence of COVID-19, results indicate that it could have played an important role in maintaining the heightened levels throughout the observed period. A regression analysis found weak to moderate correlations between crime and COVID-19 restrictions within this dataset, even when seasonality was accounted for. It is recommended for future research to continue to look for potential correlations between crime rates and other variables which could be connected to COVID-19, such as increased economic stress, alcohol consumption at home and family isolation. Considering the increase in restrictions with the new pandemic law implemented in March of 2021 in Sweden, there are also new opportunities to potentially discover correlations which warrants further investigation into the relationship between COVID-19 restrictions and crime. In order to consider the implementation of effective prevention strategies it is necessary to understand the causes of crime, and in the case of domestic violence, along with other crimes committed behind closed doors, it is vital to continue testing for correlations. Further comparisons with the stringency indexes of other countries could also show interesting contrasts regarding COVID-19 policies and subsequent crime prevalence.

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APPENDIX

Table 1. Crime codes of Assaults against women (18+). * = Crime code added 01/01-2019.

Assaults against Women (18+)	Relationship between victim and offender	Outdoors	Indoors	Aggravated, Outdoors	Aggravated, Indoors
Partner assault	Currently/previously intimate partners	9357	9365	9359	9367
Family assault	Related/family	9373*	9381*	9375*	9383*
Other assault	Other acquaintance	9374*	9382*	9376*	9384*
Unknown assault	Unknown with no relationship	0355	0365	0375	0385

Table 2. Crime codes of Assaults against men (18+). * = Crime code added 01/01-2019.

Assaults against Men (18+)	Relationship between victim and offender*	Outdoors	Indoors	Outdoors, Aggravated	Indoors, Aggravated
Partner assault	Currently/previously intimate partners	9361	9369	9363	9371
Family assault	Related/family	9377*	9385*	9379*	9387*
Other assault	Other acquaintance	9378*	9386*	9380*	9388*
Unknown assault	Unknown with no relationship	0357	0367	0377	0387