Short report

COVID-19 infection among bartenders and waiters before and after pub lockdown

Fredrik Methi ,[1] Kjetil Telle,[1] Karin Magnusson[1,2]

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[1]Cluster for Health Services Research, Norwegian Institute of Public Health, Oslo, Norway
[2]Clinical Epidemiology Unit, Orthopaedics, Department of Clinical Sciences Lund, Faculty of Medicine, Lund University, Lund, Sweden

Correspondence to
Fredrik Methi, Division for Health Services, Norwegian Institute of Public Health, 0213 Oslo, Norway;
fredrik.methi@fhi.no

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ABSTRACT

Objective To assess how different bans on serving alcohol in Norwegian bars and restaurants were related to the detection of SARS-CoV-2 in bartenders and waiters and in persons in any occupation.

Methods In 25 392 bartenders and waiters and 1 496 328 persons with other occupations (mean (SD) age 42.0 (12.9) years and 51.8% men), we examined the weekly rates of workers tested and detected with SARS-CoV-2, 1–10 weeks before and 1–5 weeks after implementation of different degrees of bans on serving alcohol in pubs and restaurants, across 102 Norwegian municipalities with: (1) full blanket ban, (2) partial ban with hourly restrictions (eg, from 22:00 hours) or (3) no ban, adjusted for age, sex, testing behaviour and population size.

Results By 4 weeks after the implementation of ban, COVID-19 infection among bartenders and waiters had been reduced by 60% (from 2.8 (95% CI 2.0 to 3.6) to 1.1 (95% CI 0.5 to 1.6) per 1000) in municipalities introducing full ban, and by almost 50% (from 2.5 (95% CI 1.5 to 3.5) to 1.3 (95% CI 0.4 to 2.2) per 1000) in municipalities introducing partial ban. A similar reduction within 4 weeks was also observed for workers in all occupations, both in municipalities with full (from 1.3 (95% CI 1.3 to 1.4) to 0.9 (95% CI 0.9 to 1.0)) and partial bans (from 1.2 (95% CI 1.1 to 1.3) to 0.5 (95% CI 0.5 to 0.6)).

Conclusion Partial bans on serving alcohol in bars and restaurants may be similarly associated with declines in confirmed COVID-19 infection as full bans.

Key messages

What is already known about this subject?

- Bartenders and waiters are at increased risk of COVID-19 when compared with persons in other occupations.
- It is unknown whether a full ban on serving alcohol is required to reduce the incidence of COVID-19, or whether a partial ban is sufficient.

What are the new findings?

- Imposing blanket bans on serving alcohol reduced the rate of detected SARS-CoV-2 among bartenders and waiters by 60% within 4 weeks after implementation. A partial ban on serving alcohol (eg, after 22:00 hours) was associated with a similar decline in detected SARS-CoV-2 as a full blanket ban.

How might this impact on policy or clinical practice in the foreseeable future?

- Our results show that partial bans on serving alcohol in bars and restaurants may be similarly associated with declines in confirmed COVID-19 among bartenders and waiters as full bans. Considering the burden of full bans to owners and workers in bars and restaurants, hourly restrictions of serving alcohol, that is, from 22:00 hours, may be explored further in reducing the spread of the SARS-CoV-2.

INTRODUCTION

We recently reported that bartenders and waiters are among the occupations with the highest COVID-19 incidence in Norway.[1] Several clusters of virus outbreaks have been related to pubs and restaurants in Austria, Japan and Thailand.[2 3] Despite its widespread use, the effect of different restrictions imposed on bars, pubs and restaurants in reducing the spread of the virus is unknown. It is also unknown how strict restrictions should be in order to reduce the spread of the virus, that is, whether full bans on serving alcohol are required to limit the spread of SARS-CoV-2, or whether partial bans are sufficient.

We aimed to study whether municipalities that introduced a ban on serving alcohol had a greater reduction of the incidence of COVID-19 when compared with neighbouring municipalities that introduced no ban, as well as whether a partial ban could be similarly effective in reducing transmission as a full ban.

METHODS

Data sources and population

Using a pre–post intervention study design with comparison groups, we used individual-level linked nationwide register data from BeredtC19, which contains, for example, information of every PCR test for SARS-CoV-2 performed in Norway (from the Norwegian Surveillance System for Communicable Diseases) and all employees in Norway (from the Employer and Employee register).[4]

Occupation

Bartenders and waiters were identified as employees with at least one of the International Standard Classification of Occupation (ISCO-08) codes 5131 (waiters) or 5132 (bartenders) in the Employer and Employee register, as registered in week 34 (17 August 2020–23 August 2020). Workers in any occupations were identified as persons that were registered with any ISCO-code (including bartenders and waiters).

Outcome: COVID-19

COVID-19 was identified as having a confirmed positive PCR test within 10 weeks before or 5 weeks after implementing bans on serving alcohol.

Definition of blanket ban on serving alcohol

Data on local bans on serving alcohol in the fall 2020 (week 45–52) were gathered from national authorities, newspapers and the respective municipalities, and classified by the time they went into effect, as well as their level of strictness.[5–7] We included all municipalities in Norway with local bans on alcohol in the given time period, as well as their neighbouring municipalities. We classified local variations of restrictions in three groups, using information from 102 municipalities: (1) municipalities with full ban (ie, no serving of alcohol allowed), (2) municipalities with partial ban (eg, no serving of alcohol after 22:00 hours) and (3) municipalities with no ban that were neighbours to the municipalities with full or partial ban, and thus, assumed to have similar trends of transmission (online supplemental figure 1 and table 2).

Statistical analyses

We calculated the average weekly rates of testing and detection of SARS-CoV-2 before and after imposing restrictions in each municipality that had one of the three types of alcohol bans. We treated the dependent variable, detection of SARS-CoV-2 as a binary variable (yes/no) denoting whether each individual was positive in the respective week.

We transformed all the calendar weeks to relative weeks for each municipality (including those with no ban, which we assigned the same implementation week as the neighbouring municipality with partial or full ban) by setting the first 7 days after the implementation in the municipality to be the relative week 0. For each level of restriction (full, partial and no ban), we then estimated rates of COVID-19 (with 95% CI) from 10 weeks prior to week 0 to 5 weeks after week 0. Thus, we compared the COVID-19 rate for bartenders and waiters working in a municipality with full ban, with bartenders and waiters working in a municipality with partial ban, as well as with bartenders and waiters working in a neighbouring municipality with no ban. We performed logistic regression analyses adjusted for testing behaviour (testing negative for COVID-19 in the respective week) as well as age, sex and municipal population. Age and population were operationalised as continuous variables. SEs were clustered on the individual, and 95% CI are reported in online supplemental table 1 and figure 2. Finally, we repeated all analyses using COVID-19 rates for workers in any occupation as outcome variable. The latter analyses could improve precision and account better for other restrictions that may be implemented simultaneously as the alcohol ban. The statistical software used was STATA MP V.16.

Patient and public involvement

Patients and the public were not involved in the design or conduct, or reporting, or dissemination plans of this study.

RESULTS

Of the 102 municipalities, 13 imposed a full ban (covering 678 264 persons) and 28 a partial ban (covering 508 216 persons) on serving of alcohol. The remaining 61 municipalities did not impose any local restrictions (covering 335 240 persons) (online supplemental figure 1). We studied in total 1 521 720 persons, of which 13 618, 7610 and 4164 bartenders and waiters worked in municipalities with full, partial and no ban, respectively, with whole-period COVID-19 rates of 25.2, 20.6 and 11.3 per 1000, respectively.

Bartenders and waiters

In municipalities that implemented a full ban, the rate with COVID-19 for bartenders and waiters (2.8 per 1000, 95% CI 2.0 to 3.6) was higher than that for municipalities that implemented no ban (1.6 per 1000, 95% CI 0.2 to 3.1) in the week of implementation, declining by 60% (to 1.1 per 1000, 95% CI 0.5 to 1.6) by 4 weeks after the implementation to similar levels as for those with no ban (1.2 per 1000, 95% CI 0.0 to 2.5) (figure 1). A similar pattern was observed when comparing partial ban with no ban (figure 1). Thus, both in municipalities with full and partial bans, COVID-19 among bartenders and waiters had been reduced by 50%–60% (to 1.3 per 1000, 95% CI 0.4 to 2.2 for partial bans and 1.1 per 1000, 95% CI 0.5 to 1.6 for full bans) by 4 weeks (figure 1). We could not detect notable sex differences (online supplemental figure 3).

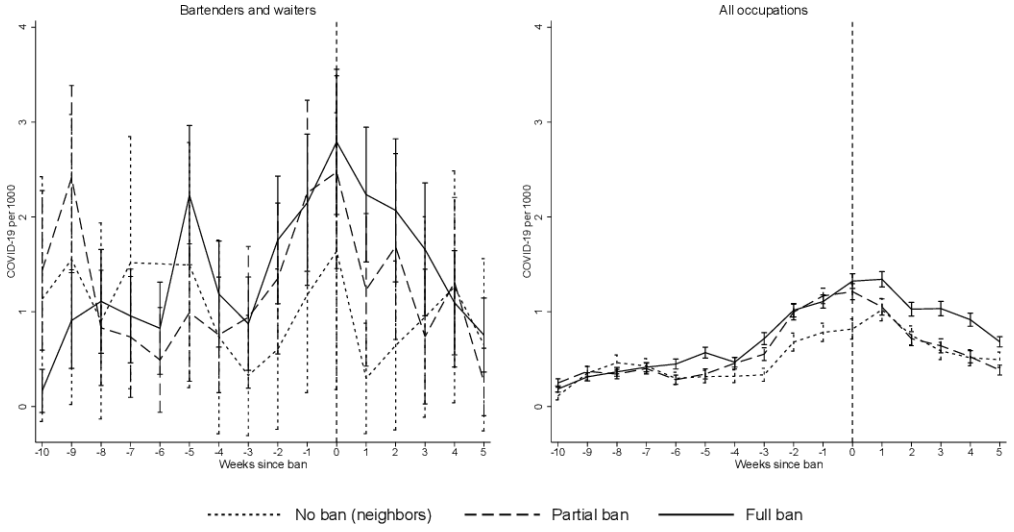

Figure 1 Estimated rates of confirmed COVID-19 per 1000 with 95% CI using logistic regression adjusted for age, sex, testing and municipal population.

Workers in any occupation

In municipalities that implemented a full ban, the rate with COVID-19 for workers in any occupation (1.3 per 1000, 95% CI 1.3 to 1.4) was higher than that for municipalities that implemented no ban (0.8 per 1000, 95% CI 0.7 to 0.9) in the week of implementation (figure 1). The COVID-19 rate in municipalities with full ban declined by 30% (to 0.9 per 1000, 95% CI 0.9 to 1.0) by 4 weeks after the implementation as compared with 0.5 per 1000 (95% CI 0.4 to 0.6) for municipalities with no ban (figure 1). Similarly, in municipalities implementing partial bans the rate of COVID-19 declined by almost 60% from 1.2 per 1000 (95% CI 1.1 to 1.3) to 0.5 per 1000 (95% CI 0.5 to 0.6) (figure 1). Again, we could not detect notable sex differences (online supplemental figure 3).

DISCUSSION

In this study of 1 521 720 persons including all bartenders, waiters and other workers in 102 municipalities with bans on serving of alcohol in Norway and their neighbouring municipalities, we report that both partial and full bans on serving alcohol are associated with a lower incidence of COVID-19.

To our knowledge, the current study is the first to assess effects of full or partial bans on serving alcohol during the COVID-19 pandemic. Our findings shed new light on previous studies, as we show that transmission is reduced once hourly or full restrictions on serving alcohol are implemented, adding to the evidence that physical distancing interventions are associated with a reduced incidence of COVID-19.[8]

Our more certain findings of a reduction of the incidence of COVID-19 for workers in any occupation following full or partial blanket ban may imply that full and partial bans on serving alcohol are effective in reducing transmission among persons with any occupation (ie, both bartenders and waiters and other occupations). However, when interpreted with care, these findings may still be of importance for informing local and national authorities in their implementation of restrictions, as well as for companies in the catering and night life business to help protect their workers and customers.

Some important limitations should be mentioned. First, we could not rule out that infection rates might have declined regardless of the imposed bans. Indeed, when interpreting the estimates week by week, we observe a decline in COVID-19 from the first week, but may have expected a longer lag from implementation of bans to observable effects. Fully randomised designs would be required to exclude this potential bias, however the observed pattern may also be explained by a short (1–6 days) incubation period of the virus.

Second, restrictions on alcohol serving were rarely or never imposed alone. As an example, in the same week as the first bans were imposed (week 45), the government also encouraged people to limit social contact and avoid unnecessary domestic travels.[6] It is likely that also the municipalities with partial vs full bans implemented such comeasures, whereas the neighbouring municipalities with no ban did not.

In conclusion, we report that partial bans on serving alcohol in bars and restaurants may be similarly associated with declines in confirmed COVID-19 among bartenders and waiters as full bans.

Twitter Fredrik Methi @FredrikMethi

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ORCID iD

Fredrik Methi http://orcid.org/0000-0002-7091-0806

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