Characteristics of Household Transmission of COVID-19

Journal Article, Cohort study

April 17, 2020

Li W, Zhang B, Lu J, Liu S, Chang Z, Cao P, Liu X, Zhang P, Ling Y, Tao K, Chen J. The characteristics of household transmission of COVID-19. Clinical Infectious Diseases. 2020 Apr 17. [Ahead of print]. Available from: https://doi.org/10.1093/cid/ciaa450

Summary

Methods:

- Retrospective data on household transmission of COVID-19 cases were systematically analysed.
- Data were collected from index patients/households (n=105) and household contacts (n=392) in two local hospitals in Hubei province, China.
- When the index case was diagnosed and hospitalized, the close contacts were quarantined for 14 days.
- The quarantined contacts were monitored daily for symptoms and swabbed at the beginning and half way through the quarantine period.
- Index cases had an exposure history within 14-days since symptom onset of travel to Wuhan, meeting people from Wuhan and visit to high-risk locations (e.g. hospitals, supermarkets, railway stations). Family members did not have such exposures.
- Home isolation of index case involved wearing mask, eating and residing separately.

Results:

- Secondary transmission occurred in 64 of 392 household contacts (Secondary attack rate, SAR=16.3%).
- The SAR was significantly lower in children <18 years (4.0%) compared to adults ≥18 years (20.5%).
- The SAR was 0% when index patients were isolated at home immediately after onset of symptoms till hospitalization compared to 18.3% where immediate isolation was not done.
- The spouses were more likely to get infected (27.8%) compared to other household contacts (17.3%).
- 14.1% (9 of 64) secondary cases remained asymptomatic during follow-up.
- The contact's gender, case's symptom profile, time between symptom onset and hospitalization (exposure period) were not related to household transmission.

Conclusion:

- Study suggests a high infection rate (SAR=16.3%) in COVID-19 in household transmission.
- A significantly higher SAR of SARS-CoV-2 for adults than children indicates high adult susceptibility. However, impact of exposure factors like: contact behaviour, time and movement must be duly explored.
- High number of asymptomatic secondary cases suggests high risk of unapparent transmission within household contacts.
- Early self-imposed isolation and strict compliance is effective in limiting transmission to household contacts.

Appraisal

- The study employs combined cohort design where contact history of index cases was assessed with prospective observation of household contacts for COVID-19.
- Study of household model is definitive with fixed exposures making it feasible to estimate the transmissibility and infectivity of prevalent virus.
- The household transmission of 16.3% for COVID-19 is higher compared to MERS-CoV (4%) (Drosten et al. 2014), SARS (10%) (Wilson-Clark et al. 2006) and 2009 pandemic influenza A (H1N1) (13%) (Cauchemez et al. 2009).
- The median time between symptom onset in index and contact cases was 6 days.
- A SAR of 0% in early isolation suggests importance of early and strict household isolation policy for mild uncomplicated cases.
- Delay in hospitalisation does not necessarily increase the risk of household transmission, indicating home isolation can be extended for mild cases.
- Higher SAR in adults compared to children must be explored to ascertain whether it is due to biological susceptibility or contact patterns.

Opinion

The study delves into COVID-19 household transmission dynamics which can guide home isolation policy in non-severe COVID-19 cases. It suggests minimal risk of COVID-19 transmission among household contacts if early and strict isolation (masking, eating and residence) are followed. Physical distancing is suggested for practice within households especially for high risk group and close contacts like spouses. Indoor household transmission of COVID-19 presents a high risk of infection among contacts due to high number of asymptomatic secondary cases. However, with proper case isolation and testing and follow-up of contacts household COVID-19 transmission can be significantly minimized.

Appraisers

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