

An opportunistic infection during stay home period in COVID 19 outbreak; Helicobacter Pylori

Mesut Aydin^{1*}, Serhat Ozer², Yaren Dirik¹, Ahmet Cumhur Dulger¹

1 Van Yuzuncu Yil University, School of Medicine, Dept of Gastroenterology, Van TR
2 Private Defne Hospital, Dept of Gastroenterology, Hatay, TR

* Corresponding Author: Mesut Aydin E-mail: gmstaydin@gmail.com

ABSTRACT

Objective: Helicobacter pylori infection is a well-established risk factor for gastric cancer, which is more common in developing countries where poor sanitation and domestic overcrowding are common. We tried to analyze the impact of the pandemic on Helicobacter pylori infection during COVID 19 related curfew and stay-at-home order.

Material and Methods: Between 1-30 June 2020 (during stay-at-home order), a total of 172 dyspeptic patients who underwent upper gastrointestinal system endoscopy at our institution following stay-at-home order during COVID pandemic were included in this study along with a control group covering 192 dyspeptic patients who underwent endoscopy between 1-20 June 2019.

Results: When we analyzed gastric biopsy specimens, those who faced stay-at-home order had similar rates of intestinal metaplasia (22% versus 29%; $p=0.15$) and atrophic gastritis (24% versus 29%; $p=0.396$) compared to recent year's data. On the other hand, the rate of H.pylori infection was higher compared to pre-COVID period (59% vs. 46%, $p<0.05$).

Conclusion: Domestic overcrowding during COVID 19 related stay-at-home order is a risk factor for H.pylori infection.

Keywords: Helicobacter pylori, COVID 19, Stay-at-home order, SAHO

INTRODUCTION

Novel coronavirus (COVID 19) infection is one of the most fearful pandemics in recent decades and is associated with increased rates of mortality with well-established risk factors including diabetes mellitus, ischemic heart disease, and cancer (1).

Given established person-to-person transmission of the disease, most countries have ordered stay at home to prevent the spread of the infection (2, 3, 4).

More than 80% of individuals in Turkey have faced Stay-at-Home Order (SAHO) under government control since the pandemic began. Governors in Turkey also ruled a wide range of restrictions in addition to SAHO including interior trips and cancellations of public events. Despite substantial evidence that quarantine damages quality of life, increases mortality, and decreases socioeconomic status, stay-at-home order had to be ruled by the governors (5).

H.pylori infection is one of the leading causes of gastric cancer and it is still endemic in the Middle East (6).

In addition, high serum urea and creatinine levels, useful tools for evaluation of health status, are also associated with increased risk for H.pylori infection (7).

The epidemiological dynamics of HP infection during SAHO remains unknown; therefore we analyzed time-dependent changes in HP infection during the SAHO period.

Research Article

Received 10-04-2020

Accepted 26-04-2021

Available Online: 26-04-2021

Published 30-04-2021

Distributed under
Creative Commons CC-BY-NC 4.0

OPEN ACCESS



MATERIAL and METHODS

Between 1-30 June 2020 (during stay-at-home order), a total of 172 dyspeptic patients (mean age 56 years) who underwent upper gastrointestinal system endoscopy at our institution following stay-at-home order during COVID pandemic were included in this study.

Of those, 82 (47,7%) were male. Biopsy specimens of gastric mucosa were evaluated by the pathologists of our institution. We also identified data of 192 dyspeptic adults in the hospital data system that underwent endoscopy between 1-30 June 2019.

Patients demographic characteristics and laboratory parameters were also obtained from electronic health records. We excluded those with acute gastrointestinal bleeding, gastric cancer, and sepsis on admission.

They were included in the study after obtaining consent from the patients who participated in the study. Among study subjects, baseline clinical characteristics, biochemical and hematological parameters were compared between pre-COVID period and post-SAHO course.

Statistical Analyzes: Chi-square and t-test were used for statistical analysis and a p-value of lower than 0.05 was considered significant. The study was approved by the Van Yuzuncu Yil University ethics committee(Etical number:2020/03-01)

RESULTS

After SAHO at the entire Turkey, 150 patients were referred to the endoscopy clinic.

There was no difference in age, gender, race, co-morbidities, signs, and symptoms of dyspepsia, renal function, cardiac failure, presence of pulmonary hypertension between SAHO-experienced and non-experienced subjects.

In SAHO group, the mean age was 55 ± 14.9 years, 43.8% were male, and 54% were farmers. In the time-matched control group, the mean age was 56.5 ± 15 years, 47.7 % were male, and 55% were farmers.

Compared to previous year, SAHO-experienced dyspeptic subjects had higher hematocrit (40 versus 41; $p= 0.001$), higher urea (28.2 versus 33.4 mg/dl; $p=0.009$), higher serum creatinine (0.8 versus 0.89 mg/dl.; $p= 0.003$) and higher AST (21 versus 23 U/L; $p= 0.01$) levels.

Interestingly, serum albumin levels did not change after SAHO compared to pre-COVID period (4.5 ± 0.7 versus 4.72 ± 0.9 mg/ dl; $p= 0.574$) (Table-1).

When we analyzed gastric biopsy specimens, those who faced stay at home order had similar rates of intestinal metaplasia (22% versus 29%; $p=0.15$) and atrophic gastritis (24% versus 29%; $p= 0.396$) compared to recent year's data. On the other hand, the rate of H.pylori infection was higher compared to pre-COVID period (59% vs. 46%, $p<0.05$) (Table-2).

Table 1: Laboratory data of patients

	n	Before COVID-19***	n	After COVID-19***	p
AGE*	192	56,5 (54,1-58,8)	172	55 (52,4-57,5)	0,395
HEMOGLOBIN**	147	13,1 (12,8-13,5)	171	13,1 (12,8-13,4)	0,890
HTC*	147	40,0 (39,2-40,9)	171	41,1 (39,2-41,0)	0,001
MCV**	147	86,2 (85,3-87,0)	171	86,9 (86,0-87,9)	0,067
WBC**	147	8,20 (6,92-9,48)	171	7,23 (6,89-7,57)	0,410
NEUTROPHIL			171	4,81 (3,89-5,73)	
LYMPHOCYTE	147	2,36 (2,02-2,70)			
PLATELET**	147	251 (240-262)	171	261 (249-272)	0,268
GLUCOSE**	147	111 (105-116)	170	115 (109-122)	0,129
UREA **	192	28,2 (24,4-32,0)	171	33,4 (30,3-36,4)	0,009
CREATININE*	146	0,89 (0,83-0,95)	172	0,80 (0,76-0,84)	0,003
AST**	146	21 (19-22)	170	23 (21-25)	0,011
ALT**	146	21 (18-23)	171	20 (18-23)	0,291
ALBUMIN**	52	4,57 (4,43-4,71)	100	4,72 (4,3-5,14)	0,574

*Independent T-Test, **Mann Whitney U, ***Mean (95% CI)

Table 2: Endoscopic findings of patients

	Before COVID-19	After COVID-19	p*
Male	84 (43,8%)	82 (47,7%)	
Female	108 (56,3%)	90 (52,3%)	0,453
H. Pylori	95 (46 %)	101 (59 %)	0,049
Metaplasia	42 (21,9%)	49 (29,0%)	0,150
Atrophy	46 (24,0%)	48 (28,2%)	0,396

*Pearson Chi-Square test

DISCUSSION

More than 80% of individuals in Turkey faced SAHO between 1 April 2020 and 31 May 2020, despite substantial evidence on starting SAHO without enough financial status disturbed quality of life, increased mortality, and healthcare costs. Barriers to health access, overcrowded conditions beyond hospital capacity during COVID pandemic and socioeconomic turmoil prior to SAHO initiation have been implicated in this phenomenon (8). This, in turn, led to further lower health parameters in those with low income. Dietary restrictions and diminished social lifestyle might also influence the rate of *H. pylori* infection amid the COVID-19 pandemic. The distribution of *H. pylori* is influenced by age, sex, geographical location, ethnicity, and socio-economic factors (9). Thus we conducted this study to reveal what kind of changes occurred after SAHO in terms of histopathological findings on gastric biopsy specimens as well as other laboratory parameters. Epidemiological studies indicate that nutritional alterations and overcrowding increase the risk of HP infection in adults. However, nearly all prior studies in the setting of natural disasters assessed HP as a key sign of the deterioration of the socioeconomic status (10, 11). A recent study demonstrated the association between natural disasters and an increased rate of HP infection (12, 13). However, there was no clinical study investigating the rate of HP infection among dyspeptic patients who faced SAHO at least 2 months. Most of the subjects who faced SAHO during the COVID 19 pandemic had less physical activity in many countries. This sedentary lifestyle in those subjects is associated with higher cardiovascular mortality risk. The restrictions on physical activity could also be a driver of new infections including HP. Due to the action of catecholamine; lymphocytes usually increase in circulation during exercise and return to baseline levels or below within a few hours after exercise. The number and function of natural killer (NK) cell display the most homogenous response to exercise (increase during and decrease after) (14, 15). Renal failure is an established risk factor for morbidity and mortality in adults and children. Adult studies showed an association between renal failure and socioeconomic turmoil in different settings (16). It has been shown that the increasing rate of HP infection has been linked to poor resource settings (17). Although we did not obtain study subjects financial income and dietary patterns, we postulated that disturbed economic and hygienic conditions during the COVID isolation period could be a driver of *H. pylori* infection. On the other hand, it might be due to a higher rate of emergency admissions of severely ill patients during the isolation period. Recent COVID studies found that a lack of systematic approaches regarding tracking patients through health care providers were mainly responsible for the spreading of the different diseases during the COVID 19 pandemic (18, 19). This study also showed that stay-at-home order had a significant effect on AST levels. In contrast to the pre-COVID group, the SAHO group was more likely to have higher AST levels at baseline. HP infection is the fastest-growing cause of gastric cancer in the world. Treatment for HP infection has averted a huge number of gastric cancers and blunted the increase in mortality from this cancer in the general population. HP infection also remains the leading cause of gastric cancer among subjects who have poor socioeconomic status (20, 21).

Moreover, natural disasters including earthquakes have recently been shown to have a profound epidemiologic impact on the prevalence of HP infection (11). Multiple methods of assessing HP infection are currently being evaluated to determine an optimal approach for the identification of the disease. We chose histopathological examination, the most valuable method to assess the presence of HP infection. In the current study, both of control subjects and study patients underwent gastric endoscopy, and biopsy specimens were obtained as well. Prevalence of HP was higher compared to pre-COVID subjects, suggesting additional investigation is needed to understand the key facilitators of disease development.

We postulated that the prevalence of HP infection is on the rise particularly during the COVID pandemic due to a rise in social isolation, sedentary lifestyles, low income, and poor nutrition. Social isolation and stay-at-home order related to the COVID pandemic pose a substantial health care disease burden in the context of HP infection.

CONCLUSIONS

Stay at home order was identified as a significant modifiable risk factor for both HP infection and renal failure. Early identification of HP infection during the SAHO course may avoid delay inappropriate therapies.

More than 80% of individuals in Turkey faced SAHO in this year, despite substantial evidence on starting SAHO without enough financial status disturbed quality of life, increased mortality and healthcare costs

Despite substantial evidence that quarantine damages quality of life, increases mortality, and decreases socioeconomic status, stay at home order had to be ruled by the governors

The distribution of *H. pylori* is influenced by age, sex, geographical location, ethnicity, and socio-economic factors

We postulated that the prevalence of HP infection is on the rise particularly during COVID pandemic due to a rise in social isolation, sedentary lifestyles, low income and poor nutrition. Social isolation and stay at home order related to the COVID pandemic pose a substantial health care disease burden in the context of HP infection

Author contributions: MA, SO, YD, ACD; Literature search and study design, Patient examination and therapies, experiments, statistical analyzes, MA; Article write up and revisions.

Conflict of interest: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This research did not receive and specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical issues: All authors declare originality of research.

REFERENCES

1. Taisheng L. Diagnosis and clinical management of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) infection: an operational recommendation of Peking Union Medical College Hospital (V2.0), *Emerging Microbes & Infections*, 2020; 9:1, 582-585

2. Coronavirus Disease-19: Quarantine Framework for Travelers Entering Korea Quarantine Management Team, COVID-19 National Emergency Response Center Osong Public Health Res Perspect. 2020 Jun; 11(3): 133–139.
3. Tang S., Tang B., Bragazzi N. Analysis of COVID-19 epidemic traced data and stochastic discrete transmission dynamic model. *Sci Sin Math.* 2020;50 doi: 10.1360/SSM-2020-0053.
4. He D., Zhao S., Lin Q. The relative transmissibility of asymptomatic COVID-19 infections among close contacts. *Int J Infect Dis.* 2020;94:145–147.
5. Rahmet GÜNER, İmran HASANOĞLU, Firdevs AKTAŞ. COVID-19: Prevention and control measures in community. *Turk J Med Sci.* 2020; 50(3): 571–577. Published online 2020 Apr 21. doi: 10.3906/sag-2004-146
6. Wroblewski LE, Peek RM Jr, Wilson KT. Helicobacter pylori and gastric cancer: factors that modulate disease risk. *Clin Microbiol Rev.* 2010;23(4):713-739. doi:10.1128/CMR.00011-10
7. Pan W, Zhang H, Wang L, Zhu T, Chen B, Fan J. Association between Helicobacter pylori infection and kidney damage in patients with peptic ulcer. *Ren Fail.* 2019;41(1):1028-1034. doi:10.1080/0886022X.2019.1683029
8. Begum Satici, Emine Gocet-Tekin, M. Engin Deniz, Seydi Ahmet Satici. Adaptation of the Fear of COVID-19 Scale: Its Association with Psychological Distress and Life Satisfaction in Turkey. *Int J Ment Health Addict.* 2020 May 8 : 1–9. doi: 10.1007/s11469-020-00294-0 [Epub ahead of print]
9. Hooi JKY, Lai WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, Malfertheiner P, Graham DY, Wong VWS, Wu JCY, Chan FKL, Sung JY, Kaplan GG, Ng SC. Global Prevalence of Helicobacter pylori Infection: Systematic Review and Meta-Analysis. *Gastroenterology.* 2017;153:420–429. [PubMed] [Google Scholar].
10. Smith S, Fowora M, Pellicano R. Infections with Helicobacter pylori and challenges encountered in Africa. *World J Gastroenterol.* 2019;25(25):3183-3195. doi:10.3748/wjg.v25.i25.3183
11. Suvak B, Dulger AC, Suvak O, Aytemiz E, Kemik O. The prevalence of helicobacter pylori among dyspeptic patients in an earthquake-stricken area. *Clinics.* 2015;70(1):69-72. [https://doi.org/10.6061/clinics/2015\(01\)12](https://doi.org/10.6061/clinics/2015(01)12)
12. Kurokawa M, Nukina M, Nakanishi H, Miki K, Tomita S, Tohdo A. *Kansenshogaku Zasshi.* 1996;70(9):970-975. doi:10.11150/kansenshogakuzasshi1970.70.970.
13. Yamanaka K, Miyatani H, Yoshida Y, et al. Hemorrhagic gastric and duodenal ulcers after the Great East Japan Earthquake Disaster. *World J Gastroenterol.* 2013;19(42):7426-7432. doi:10.3748/wjg.v19.i42.7426
14. University of Virginia Health System. COVID-19: exercise may help prevent deadly complication. April 15, 2020. Available from: <https://newsroom.uvahealth.com/2020/04/15/covid-19-exercise-may-help-prevent-deadly-complication/>. Accessed April 14, 2020.
15. Malm, C. Exercise Immunology. *Sports Med* 34, 555–566 (2004). <https://doi.org/10.2165/00007256-200434090-00001>
16. İnci, A , Çoban, M , Sarıkaya, M , Maden, Ü . (2017). Prediyaliz kronik böbrek hastalarında kesitsel bir çalışma: Yaşam kalitesi ve etkileyen faktörler. *Kocatepe Tıp Dergisi* , 18 (4) , 130-135 . DOI: 10.18229/kocatepetip.368668
17. Andréa B. C. Braga, André M. N. Fialho, Maria N. Rodrigues, Dulciene M. M. Queiroz, Andreia M. C. Rocha, Lucia L. B. C. Braga, Helicobacter pylori Colonization Among Children up to 6 Years: Results of a Community-based Study from Northeastern Brazil, *Journal of Tropical Pediatrics*, Volume 53, Issue 6, December 2007, Pages 393–397, <https://doi.org/10.1093/tropej/fmm051>
18. van de Haar, J., Hoes, L.R., Coles, C.E. et al. Caring for patients with cancer in the COVID-19 era. *Nat Med* 26, 665–671 (2020). <https://doi.org/10.1038/s41591-020-0874-8>
19. Sun, J., Aghemo, A., Forner, A., & Valenti, L. (2020). COVID-19 and liver disease. *Liver International.*
20. Zamani, M., et al. "Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection." *Alimentary pharmacology & therapeutics* 47.7 (2018): 868-876.
21. Attila, Tan, et al. "Upper socioeconomic status is associated with lower Helicobacter pylori infection rate among patients undergoing gastroscopy." *The Journal of Infection in Developing Countries* 14.03 (2020): 298-303.