

Research Article

Point prevalence for COVID-19 among temporary tea farmers with mass screening: An example from Turkey

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Abstract

Objective: Since the detection of the first COVID-19 case in Rize on 20th of March 2020, there were a total of 229 reported cases until 23 May 2020. There is currently no information available about the asymptomatic COVID-19 cases in Turkey. This study aims to detect the point prevalence of -19 among tea farmers who came to Rize from other provinces during May 2020. **Methods:** Among the 40 thousand estimated tea workers who came to Rize in May 2020, a total of 11,180 PCR results were evaluated. The specimens were collected by healthcare workers working for the Rize Provincial Directorate of Health and analyzed in the Reference Laboratory for Microbiology of the Ministry of Health. The point prevalence of being PCR positive for -19 was calculated. **Results:** The point prevalence of -19 among asymptomatic tea workers was found to be 0.197%. Being -19 positive was not statistically significant with age groups and gender ($p= 0.183$ and $p= 0.234$, respectively). **Conclusions:** Sudden demographic changes in society is a major challenge for establishing a sustainable control policy for COVID-19. Defining the asymptomatic proportions of the population is crucial for planning effective control strategies. Calculating point prevalence among an asymptomatic population with mass screening is a useful tool for this purpose.

Keywords: COVID-19, mass screening, point prevalence, asymptomatic cases

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Geçici çay işçilerinde kitlesel tarama ile COVID-19 nokta prevelansının belirlenmesi: Türkiye’den bir örnek

Öz

Amaç: Rize’de 20 Mart 2020 tarihinde ilk COVID-19 vakasının tanınmasından itibaren 23 Mayıs 2020 tarihine kadar toplam 229 vaka rapor edilmiştir. Günümüzde Türkiye’de asemptomatik COVID-19 vakaları ile ilgili bir bilgi bulunmamaktadır. Bu çalışmanın amacı diğer illerden Rize’ye Mayıs 2020 döneminde çay tarımı amacı ile gelen kişiler arasında COVID-19 nokta prevelansının belirlenmesidir. **Yöntem:** Rize iline Mayıs 2020 döneminde gelen tahminen 40 bin çay üreticisinde yapılan toplam 11180 PCR testi sonucu değerlendirilmiştir. Örnekler Rize İl Sağlık Müdürlüğü bünyesinde çalışan sağlık personeli tarafından alınmış ve Sağlık Bakanlığı’nın Referans Mikrobiyoloji Laboratuvarında değerlendirilmiştir. COVID-19 açısından pozitif sonucu olanlar için nokta prevelansı hesaplanmıştır. **Bulgular:** Asemptomatik çay üreticileri arasında COVID-19 nokta prevelansı %0.197 olarak hesaplanmıştır. COVID-19 yönünden pozitif olmak ile yaş grupları ve cinsiyet arasında istatistiksel olarak anlamlı bir ilişki bulunmamıştır (sırasıyla $p=0.183$ and $p=0.234$). **Sonuç:** Toplumdaki ani demografik değişiklikler, COVID-19 ile mücadelede sürdürülebilir kontrol politikaları belirlenmesinde önemli bir zorluktur. Nüfus içindeki asemptomatik kişilerin belirlenmesi, etkili kontrol stratejilerinin planlanabilmesi için büyük önem taşımaktadır. Kitlesel tarama yöntemi ile asemptomatik bir grup içindeki nokta prevelansının belirlenmesi bu amaca ulaşmak için kullanışlı bir yöntemdir.

Anahtar kelimeler: COVID-19, kitlesel tarama, nokta prevelansı, asemptomatik vakalar

Introduction

The first COVID-19 case has been detected on 11 March 2020 in Turkey, and on the same date, the World Health Organization characterized the COVID-19 outbreak as a pandemic.¹ The number of COVID-19 cases continues to grow countrywide. Rize is a small city in the northeast region of Turkey with a population of 343,212.² The first COVID-19 case in Rize was found on the 20th of March 2020. Up to the starting point of this study on the 23rd of May 2020, there were 155,686 and 229 cases, 1,807,673 and 4528 tests conducted, and 4308 and 10 deaths in Turkey and Rize, respectively.^{3,4}

The Centers for Disease Control and Prevention defines an asymptomatic case as “an individual infected with SARS-CoV-2 who does not exhibit symptoms during infection”.⁵ Asymptomatic transmission of the coronavirus disease (COVID-19) is an important topic and is defined as the “Achilles’ heel” of pandemic control strategies.⁶ Estimation of the asymptomatic

ratio (the percentage of carriers with no symptoms) will improve understanding of COVID-19 transmission and the spectrum of disease it causes, providing insight into epidemic spread.⁷ COVID-19 is diagnosed by a real-time reverse transcription-polymerase chain reaction (PCR) test in Turkey according to the guidelines prepared by the Ministry of Health. The PCR tests are only conducted for patients with COVID-19 specific symptoms after their admission to health centers with the approval of a physician.³ This algorithm is a barrier for identifying the prevalence of asymptomatic COVID-19 patients who continue to spread the illness. Testing for COVID-19 with PCR should both cover symptomatic and asymptomatic populations for a better understanding of the spread of the epidemic and effective use of resources to combat it.⁸ There is no research on asymptomatic COVID-19 patients in Turkey to date.

Every year in May, many tea farmers living outside of Rize come back to their farms. The massive population increase in this small duration of time raises concerns about an increase in COVID-19 cases. This study aims to determine the point prevalence of COVID-19 among the asymptomatic population coming to Rize from other provinces for tea farming with PCR screening.

Methods

Study group and design

In this cross-sectional descriptive study, the COVID-19 screenings with PCR tests were practiced by the Provincial Directorate of Health (PDoH), Rize. At the beginning of May, government officials formed control stations for all entrances of Rize. In these control stations, healthcare workers belonging to the PDoH measured the body temperatures of every person entering Rize and questioned them for COVID-19 symptoms. During this period 50,000 people entered into Rize for tea farming, including the farmers and their families, which makes up the universe of the study.

At first, it was planned to determine the sampling group by the Kish sampling method.⁹ However, with resource limitations in mind, the most active person from every family (the family member who has the most out-of-home contact) was identified. By using the records which were kept by the PDoH workers, the most active family member was informed about the upcoming PCR test procedure. At least one person from every family was included to the sampling and a total of 11,365 people composed the sample size.

For the screening, 110 teams were formed, each consisted of one physician, one nurse, and one chauffeur. Teams were trained by the professionals working at the PDoH and the Recep Tayyip Erdoğan University, Faculty of Medicine for taking nasopharyngeal samples, registration, and screening processes. Every participant's age and sex were recorded during the test procedure. After the study, patients with positive PCR results undertook therapy in

hospitals and their family members were quarantined in their houses for 14 days. Between 23rd and 3rd of May 2020, 11,191 samples were taken from preregistered tea farmers, all over 15 years of age, who accepted to participate. Of the samples, 11 were defined as insufficient, so a total of 11,180 (98.4%) samples were included in this study. Study is approved by Ethical Board of Recep Tayyip Erdoğan University, Faculty of Medicine and written consent of all participants were obtained. Some data used in this study which were not available for public, were obtained by written permissions from both the Ministry of Health and PDoH.

This study was conducted on behalf of PDoH with their resources to determine the point prevalence of COVID-19 among temporary tea farmers and providing data for local policy makers to prevent the spread of the COVID-19.

PCR analysis procedure

All samples were transferred to the Central Microbiology Reference Laboratory of the Ministry of Health in Ankara with refrigerated vehicles under ideal circumstances daily. All PCR tests were done in this laboratory.

Statistical analysis

Results are given with counts and percentages or means and standard deviations. The relation between PCR results and age groups and gender were evaluated with the chi-square test, and the significance level was accepted as $p < 0.05$.

Results

The mean age of the study population was 48.0 ± 14.8 (min. 15, max 93), and 71.8% (8093) of the participants were male.

Of the total PCR tests, 22 were positive for COVID-19, which corresponded to a point prevalence of 1.97 in a thousand (Table 1). There was no statistical significance between test results and gender and age groups ($p = 0.183$ and $p = 0.234$, respectively)(Table2).

Table 1. PCR results for the study group

PCR result	n	%
Positive	22	0.20
Negative	11,158	99.80
Total	11,180	100.00

Table 2. Relation between the PCR results and gender and age groups of the study group

		Positive	Negative	p
Gender	Male	13 (0.2%)	8018 (99.8%)	0.183
	Female	9 (0.3%)	3140 (99.7%)	
Age group	15-44	7 (0.2%)	4422 (99.8%)	0.234
	45-64	14 (0.3%)	5247 (99.7%)	
	≥65	1 (0.1%)	1489 (99.9%)	

Discussion

Asymptomatic transmission of SARS-CoV-2 is the most challenging part of the current COVID-19 pandemic control efforts.⁶ Symptom-based screening might fail to identify all SARS-CoV-2 infections, and asymptomatic people might contribute to SARS-CoV-2 transmission. The asymptomatic COVID-19 positive patients are an important risk factor for the transmission of the disease.¹⁰ These people can rapidly spread the disease among the population.¹¹ This study is the first one that defines the prevalence of asymptomatic COVID-19 cases among a community in Turkey.

During this study, PCR Testing was used to define COVID-19. Since there are no gold standard tests for identifying the sensitivity and the specificity of PCR tests, according to a recent systematic review reported a 71-98% sensitivity.¹² Currently, PCR is the most suitable test method for identifying asymptomatic patients.¹³ It is crucial to define the density of asymptomatic people in the population to determine the epidemiologic features and

contamination of COVID-19.⁷ Few sample studies exist in the literature for COVID-19 scanning on the asymptomatic people in the population. These few studies have been conducted usually for special groups and represents results only for these groups.¹⁴⁻¹⁶

It is assumed that during May 2020, nearly 50,000 people entered Rize for tea farming¹⁷. Based on TÜİK data, which has been published in May 2020, the number of People who have origins of Rize and live outside of Rize province is 406,110 for the year 2014.² This number corresponds to 10% of total people from Rize. The number of people who came to Rize and were involved in the study (11,180 people) corresponds to 3.3% of the Rize population. As of 23 May 2020, cumulative case infection rate in Turkey is 1872.2 per million¹⁸ and in the same period, the rate is 677.2 per million for Rize. It is believed that these people who came to Rize for tea farming create a risk of spreading COVID-19.

For mass screenings, CDC recommends acquiring samples from all members of the household.¹⁴ In this case, it

would be required to receive samples from 10,000 families, due to resource limitations, it would be possible to take samples only from 3000 family. With the decision of Deputy Directorate of Health preference, it was decided to take samples from only one member of the family. For this study, scanned people are individuals with the highest outside contact in the family.

Cultural and behavioral factors play a primary role in being COVID-19 positive among different societies with different sociodemographic characteristics.¹⁹ Different lifestyles of individuals, like involvement frequency to active life, causes different patterns of COVID-19 prevalence among populations.¹⁵

In this study, the point prevalence for COVID-19 was calculated as 1.97 per thousand within the screened group. Point prevalence describes the current patient density in a particular place and a particular time period²⁰. In London, among asymptomatic healthcare workers, the prevalence was determined between 1.1% and 7.1% during five different screenings, which were conducted one-week apart.¹⁶ In Spain, 5.8% of the children were identified as COVID-19 positive who were diagnosed with various other conditions in a hospital.²¹ The reason for achieving a smaller prevalence in our study compared to the screening done to special risk groups could be the large group formed by the general population.

There was no statistical significance between gender and being COVID-19 positive in the study group. According to a meta-analysis evaluating 29 different country reports shows that males and females have similar numbers of COVID-19.²² Accordingly, being positive for COVID-19 was similar between age groups. According to Liu et al., there was no relation between age and being positive for COVID-19 in China during February 2020.²³

This study shows great importance due to the fact that it allowed us to screen the groups which entered to Rize from

outside in a short period of time and also created the opportunity to take precautions by identifying asymptomatic COVID-19 cases. Mass screening is one of the best-known scientific methods for preventing the spread of COVID-19.^{24,25}

The group that we screened during our study does not consist of randomly selected individuals but the most active members of the families that have come to Rize from outside. Excluding this screening, the total number of PCR samples, which was conducted based on the algorithm published in the instructions of the Ministry of Health³ for the symptomatic population from the beginning of the pandemic to the starting date of this study is 4528⁴ in Rize. Screening a large group of individuals is the strong side of this study.

This study is especially important because it is the first mass screening conducted on an asymptomatic population and the first point prevalence study in Turkey. This study shows that sudden demographic changes in the population are a risk factor in spreading contagious diseases like COVID-19.

The most significant limitation of our study is the fact that samples do not represent the majority of the population but is limited mainly to males and young individuals.

Conflict of Interest: There is no conflict of interest to declare.

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References

1. World Health Organization. Coronavirus disease 2019 (COVID-19): situation report, 46 [online]. Available at:

<https://apps.who.int/iris/handle/10665/331443>. Accessed June 10, 2020.

2. Turkish Institution of Statistics. Demographic and Migration Statistics [online]. Available at: http://tuik.gov.tr/PreTablo.do?alt_id=1067. Accessed June 10, 2020.

3. Ministry of Health. COVID-19 Genel Bilgiler, Epidemiyoloji ve Tanı. Ankara: T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü; 2020 [online, updated 01.06.2020]; Available at: <https://COVID19bilgi.saglik.gov.tr/tr/COVID-19-rehberi.html>. Accessed June 10, 2020.

4. Ministry of Health. Digital Public Health Database Records. [online]. Available at: <https://giris.saglik.gov.tr/>. Accessed June 10, 2020. Not publicly available, accessed by written permission.

5. CDC. COVID-19 Pandemic Planning Scenarios [online, updated May 2020]. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html>. Accessed June 10, 2020.

6. Gandhi M, Yokoe DS, Havlir DV. Asymptomatic Transmission, the Achilles' Heel of Current Strategies to Control COVID-19. *New England Journal of Medicine* 2020;382(22):2158-60.

7. Nishiura H, Kobayashi T, Miyama T, Suzuki A, Jung S-M, Hayashi K, et al. Estimation of the asymptomatic ratio of novel coronavirus infections (COVID-19). *Int J Infect Dis* 2020;94:154-5. Epub 2020/03/14.

8. Lipsitch M, Swerdlow DL, Finelli L. Defining the epidemiology of COVID-19—studies needed. *New England journal of medicine* 2020;382(13):1194-6.

9. Kish L. A Procedure for Objective Respondent Selection within the Household. *Journal of the American Statistical Association* 1949;44(247):380-7.

10. Ye F, Xu S, Rong Z, Xu R, Liu X, Deng P, et al. Delivery of infection from asymptomatic

carriers of COVID-19 in a familial cluster. *International Journal of Infectious Diseases* 2020;94:133-8.

11. Jing C, Wenjie S, Jianping H, Michelle G, Jing W, Guiqing H. Indirect Virus Transmission in Cluster of COVID-19 Cases, Wenzhou, China, 2020. *Emerging Infectious Disease journal* 2020;26(6):1343.

12. Arevalo-Rodriguez I, Buitrago-Garcia D, Simancas-Racines D, Zambrano-Achig P, del Campo R, Ciapponi A, et al. False-negative results of initial rt-pcr assays for COVID-19: a systematic review. *medRxiv* 2020:2020.04.16.20066787.

13. Nishiura H, Jung S-m, Linton NM, Kinoshita R, Yang Y, Hayashi K, et al. The extent of transmission of novel coronavirus in Wuhan, China, 2020. *Multidisciplinary Digital Publishing Institute*; 2020.

14. Methodology for estimating point prevalence of SARS-CoV-2 infection by pooled RT-PCR testing. Stockholm: ECDC: European Centre for Disease Prevention and Control, 2020.

15. Dowd JB, Andriano L, Brazel DM, Rotondi V, Block P, Ding X, et al. Demographic science aids in understanding the spread and fatality rates of COVID-19. *Proceedings of the National Academy of Sciences* 2020;117(18):9696-8.

16. Treibel TA, Manisty C, Burton M, McKnight Á, Lambourne J, Augusto JB, et al. COVID-19: PCR screening of asymptomatic health-care workers at London hospital. *The Lancet* 2020;395(10237):1608-10.

17. Governorship of Rize [online]. Available at: <http://www.rize.gov.tr/haberler>. Accessed June 10, 2020.

18. HASUDER. COVID-19 Weekly News. Ankara: Association of Public Health Specialists [online]. Available at: <https://korona.hasuder.org.tr/hasuder-yeni-koronavirus-COVID-19-haber-postasi-08-06-2020/>. Accessed: June 10. 2020.

19. Walter LA, McGregor AJ. Sex- and Gender-specific Observations and

Implications for COVID-19. *West J Emerg Med* 2020;21(3):507-9.

20. Organization WH. WHO Methodology for Point Prevalence Survey on Antibiotic Use in Hospitals, version 1.1. World Health Organization, 2018 [online]. Available at: https://www.who.int/medicines/access/antimicrobial-resistance/WHO-EMP-IAU-2018_01/en/. Accessed: June 10, 2020.

21. Tagarro A, Epalza C, Santos M, Sanz-Santaeufemia FJ, Otheo E, Moraleda C, et al. Screening and Severity of Coronavirus Disease 2019 (COVID-19) in Children in Madrid, Spain. *JAMA Pediatrics* 2020. Epub 2020/04/09.

22. Webb K, Peckham H, Nd G, Raine C, Radziszewska A, Ciurtin C, et al. Sex-bias in COVID-19: a meta-analysis and review of

sex differences in disease and immunity. *Research Square* 2020(Doi: 10.21203/rs.3.rs-23651/v1).

23. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Research* 2020;287:112921.

24. Gostic K, Gomez AC, Mummah RO, Kucharski AJ, Lloyd-Smith JO. Estimated effectiveness of symptom and risk screening to prevent the spread of COVID-19. *Elife* 2020;9:e55570.

25. Shi F, Xia L, Shan F, Wu D, Wei Y, Yuan H, et al. Large-scale screening of COVID-19 from community acquired pneumonia using infection size-aware classification. *arXiv preprint arXiv:200309860*. 2020.