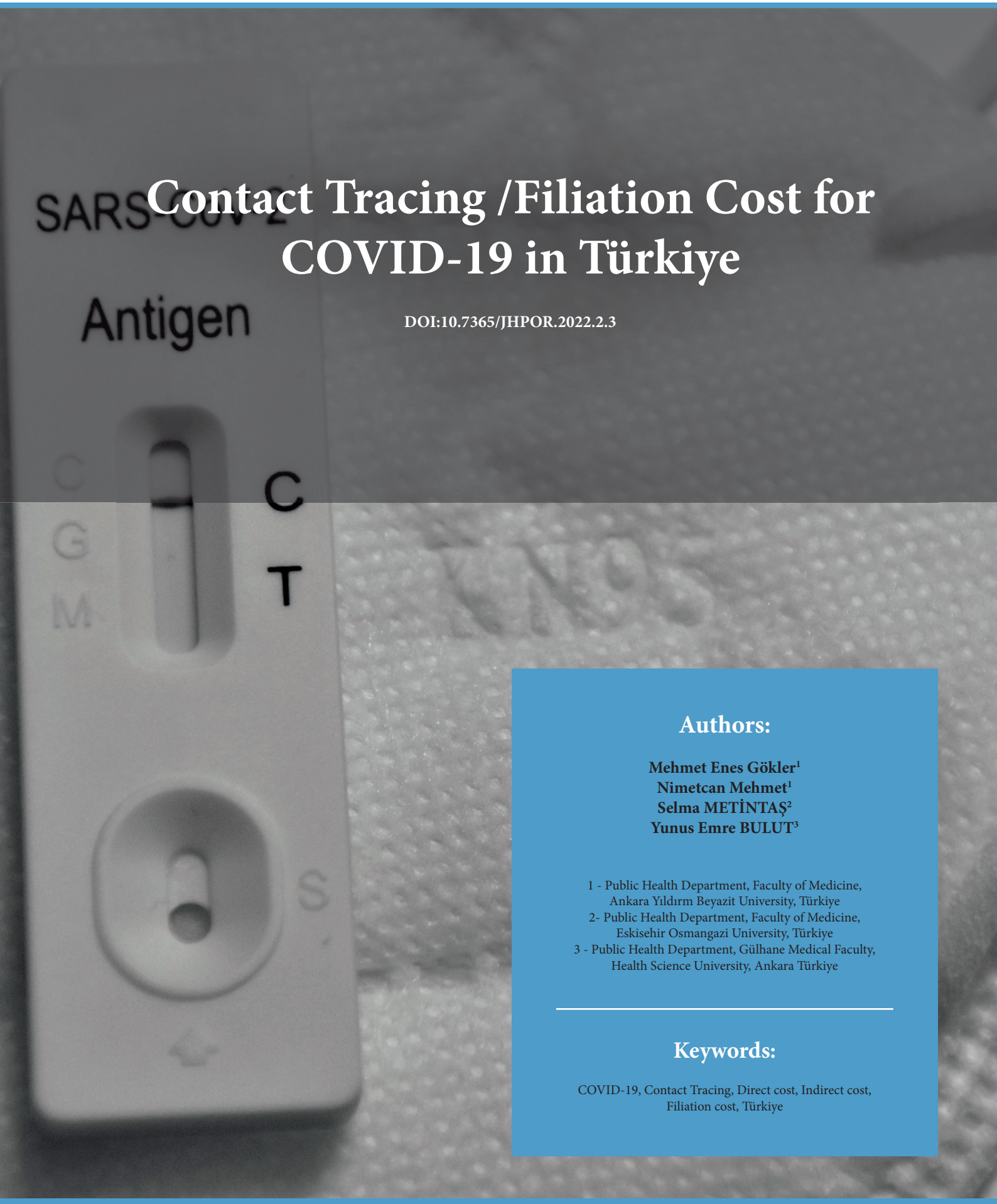
#02/2022
ISSN 2299-1247

JHPOR | Journal of Health Policy & Outcomes Research



Contact Tracing /Filiation Cost for COVID-19 in Türkiye

DOI:10.7365/JHPOR.2022.2.3

Authors:

Mehmet Enes Gökler[1]
Nimetcan Mehmet[1]
Selma METİNTAŞ[2]
Yunus Emre BULUT[3]

1 - Public Health Department, Faculty of Medicine, Ankara Yıldırm Beyazit University, Türkiye
2- Public Health Department, Faculty of Medicine, Eskisehir Osmangazi University, Türkiye
3 - Public Health Department, Gülhane Medical Faculty, Health Science University, Ankara Türkiye

Keywords:

COVID-19, Contact Tracing, Direct cost, Indirect cost, Filiation cost, Türkiye

How to cite this article?
M. Gökler, N. Mehmet, S. METİNTAŞ, Y.BULUT, Contact Tracing /Filiation Cost for COVID-19 in Türkiye J Health Policy Outcomes Res [Internet]. 2022[cited YYYY Mon DD];. Available from: http://jhpor.com/article/2294-contact-tracing-filiation-cost-for-covid-19-in-turkiye

contributed: 2022-11-03
final review: 2022-11-25
published: 2022-12-29

Corresponding author: Nimetcan Mehmet nametjan@gmail.com

Abstract

Aim
Aim of this study is to estimate direct and indirect cost of COVID-19 contact tracing (CT) for capital city of Türkiye.

Materials and Methods
This is an economic study to estimate the cost for COVID-19 CT program from March 11, 2020 to March 11, 2021. This study was conducted in Pursaklar district of Ankara city. Direct and indirect cost were estimated for national level, the direct costs include fixture, salary of the team, consumption and car while indirect costs include nutrition, transportation, communication, PPE, Food and others.

Results
Total direct cost was estimated as $ 69108,3; the highest cost was related to salary ($ 42204,0) followed by consumption ($15560,9), transportation ($5481,0) and fixture ($98,8) while indirect cost was estimated as $5763,6; the highest mean cost was related to transportation ($98,3) followed by shoes-clothes ($91,5), Vitamin-like supplement food ($65,7), food ($43,7), PPE ($34,1) and communication ($17,3) annually.

Conclusion
The total cost for COVID-19 contact tracing program for the district was estimated to be $ 69108,3 of which, 91,7% ($ 63344,7) were due to direct cost while 8,3% ($ 5763,6) were generated by indirect cost. The annual national cost for CT team for 2020 was estimated to be 106,288,565.4 $.

Introduction

COVID-19 poses a public health threat worldwide.[1] The first case of COVID-19 in Turkey was reported on 11 March 2020.[2] As of 30 November 2022, 16,919,638 COVID-19 cases have been confirmed, with 101,203 deaths reported by Türkiye.[3]

In the case of pandemics such as COVID-19, treating patients involves costs for the health system. At the same time, preventive health services aimed at protecting people from disease as part of outbreak control come at a cost. The studies show that the increased investment in contact testing and tracking yields at least 30 times the estimated economic benefit of investing in these approaches.[4] The healthcare providers have developed a range of plans for contact tracing teams that provide services during a pandemic. The US recommends allocating at least 5% of any COVID-19-related economic assistance to such health measures.[4] COVID-19 affected all sectors and the general population,[5] especially the health care workers.[6]

The whole world is trying to manage hospitals during pandemic, and individual countries are trying to solve the problems in different ways.[7]

All countries implement outbreak control programmes to combat a pandemic. Authorities can impose stricter rules and regulations to prevent and control the virus.[1] The World Health Organisation (WHO) recommends the disease monitoring practices, contact tracing and isolation rules.[8] It is understood that at the time of the emergence of COVID-19, there was no treatment or vaccine, and that the most effective method in the fight is synergy. It is recommended that a suspected, probable or laboratory-confirmed case of COVID-19 be systematically identified from all social, family/home, work, medical and other contacts.[9] According to WHO projections, 11.16% of the total funding requirement in 2021 is for surveillance, epidemiological investigation and contact tracing.[10] With the increasing number of cases during the pandemic, many health workers have been referred to district health directorates for filliation. The filliation teams go to the home of a positive person and detect contacts in the home and perform PCR swabs and provide medication. These teams conduct detailed case interviews, identify contacts, and provide patients with information on isolation processes and disease progression.[11]

The costs of transport, protective equipment and staff salaries come to mind under cost types. In addition, these teams make ongoing expenditures on items such as vitamins/dietary supplements, clothing, personal protective equipment, disinfectants and transport. It is important to disclose the costs of subsidiary teams, which are the most important means of combating a pandemic. The expectations prevail that similar pandemics will occur in our time.[12] Reporting the costs of contact tracing (CT), which is the most important intervention until a vaccine is invented for similar pandemics in the future, is important in health service planning and programme design. The aim of this study is to estimate the direct and indirect costs of CT COVID-19 for the city of Ankara, and then to estimate the costs at the national level.

Methods

In this study, the cost of the CT COVID-19 programme in Ankara, Türkiye city was estimated. The indirect and direct costs were calculated for the programme at national level.

This study estimates the cost for COVID-19 CT program in Ankara city of Türkiye. The indirect and direct costs were calculated for the program at national level.

Direct Cost

The affiliation team was assessed as one dentist or doctor and one healthcare assistant per team. In addition, there was a vehicle and driver for each team. The staff salaries were estimated based on the average gross salaries of the team members, and drivers were included in the analysis based on the minimum wage. The health workers' surcharge was calculated gross within the rules published by the Ministry of Health, and a monthly average was added to the salary. The vehicles hired for transport were projected to cover 1,000 km per month with a monthly expense. The fuel cost for a diesel vehicle was calculated at 0.4 ₺ per km. The direct costs were divided into consumables (gloves, mask, goggles, disposable surface suit, surgical gown, hand disinfectant, VTM, SWAP, battery) and equipment (filiation bag, specimen transfer bag, thermometer, blood pressure monitor, pulse oximeter). The average of the 3 most preferred products on the 3 most viewed shopping sites on Google was used to calculate the direct cost of equipment and vehicle rental. It was anticipated that subsidiary teams would serve 20 days per month and vehicles 30 days. The monthly calculated consumables were calculated by multiplying by the number of monthly working days. Per team member, we counted gloves 500 pieces, surgical mask 150 pieces, N95 mask 50 pieces, surgical gown 60 pieces, disposable coveralls 50 pieces, VTM/replacement 300 pieces, disinfectant 10 LT, goggles and surface 1 piece.

It was accepted that the team members could visit 15 cases per day. In Turkey, the government started disclosing 'asymptomatic' cases on 25 November 2020. The average number of cases from 25 November 2020 to 24 May 2021 was 21769.57 ± 15613.58 (5277-63082). The number of care teams needed according to the average number of COVID-19 cases was 1538. The total care cost in the country was estimated by multiplying the annual the costs by the number of care teams. All costs were converted from Turkish lira to dollars according to the average purchases in USD for 2020 ($1: 7.006₺)

Indirect Cost

This study was conducted in the Pursaklar district of Ankara city between 11 March 2020 and 11 March 2021. The indirect costs include food, transport, communication, personal protective equipment, food and others such as shoes, clothes, etc. The monthly indirect costs for the Branch Teams working in xxx District Health Directorate were calculated based on the questionnaire used. In the indirect cost survey, it was planned to reach all employees working in the branch office without counting the sample. The mean age of the surveyed group was 32.21 ± 3.58 years, with 47.2% being medical staff assistants and 53.12% (N: 34) male.

The survey data were calculated using the Excel package. The data are presented with mean, standard deviation, minimum, maximum.

The data of the study were calculated using the Excel package program. Data were presented with mean, standard deviation, minimum, maximum.

Results

The total cost of the COVID-19 contact tracing programme was estimated at TL 484,173.0, of which 8.3% (TL 40,380.0) were the indirect costs and 91.7% (TL 443,793.0) were the direct costs. Thermometer (424₺) and Pulse oximeter (88₺) were the most costly variables among the costs of accessories. Among the costs of consumables, VTM (28,800.0₺), SWAP (25,200.0₺) and Disposable Suit (14,400.0₺) were the highest. In our study, the total cost of transportation was 38,400.0₺. The cost item with the largest share of direct costs was identified as salaries. The annual salary of a doctor/dentist was 144,090.84 ₺, that of a medical staff assistant was 108,660.12 ₺ and that of a driver was 42,930.0 ₺. The direct cost of the COVID-19 contact tracing programme is shown in Table 1.

Table 1. Direct cost of the COVID-19 contact tracing program						
	Monthly		Annually		Annually (total)	
	Cost ₺	Quantity	Quantity	Cost Per-item ₺	Cost ₺	Team Annual Cost
Fixture						
Filiation Bag	47,0	1,0	1,0	47,0	47,0	47,0
Sample Carrying Bag	64,0	1,0	1,0	64,0	64,0	64,0
Thermometer	424,0	1,0	1,0	424,0	424,0	424,0
Blood pressure monitor	69,0	1,0	1,0	69,0	69,0	69,0
Pulse Oximeter	88,0	1,0	1,0	88,0	88,0	88,0
Consumption						
Glove	0,2	500,0	6000,0	75,0	900,0	1800,0
Mask (Surgery)	0,3	150,0	1800,0	46,5	558,0	1116,0
Mask (3M)	4,5	50,0	600,0	225,0	2700,0	5400,0
Glasses	18,0	1,0	12,0	18,0	216,0	432,0
Surface	11,0	1,0	12,0	11,0	132,0	264,0
Disposable Coverall	24,0	50,0	600,0	1200,0	14400,0	28800,0
Surgıcal Apron	9,2	60,0	720,0	552,0	6624,0	13248,0
Hand Disinfectant (1lt)	16,0	10,0	120,0	160,0	1920,0	3840,0
VTM	8,0	300,0	3600,0	2400,0	28800,0	28800,0
SWAP	7,0	300,0	3600,0	2100,0	25200,0	25200,0
Battery	5,0	2,0	24,0	10,0	120,0	120,0
Transportation						
Car Rent	2800,0	1,0	12,0	2800,0	33600,0	33600,0
Fuel	0,4	1000,0	12000,0	400,0	4800,0	4800,0
Salary						
	Salary		Fix payment	Additional payment	Monthly (total)	Annually (total)
Doctor/Dentist	5838,6		2641,3	3527,7	12007,6	144090,8
Assistant Health Personnel	5195,7		1929,6	1929,6	9055,0	108660,1
Driver	3577,5		-	-	3577,5	42930,0

Note: cost in Turkish Lira

The highest cost item in indirect costs for the doctor/dentist is transport (408.1±248.1), footwear-clothing (356.3±295.7) and vitamin-like supplementary food (207.7±159.6) . The ranking among medical auxiliaries was the same. Overall, the highest cost item in direct costs is transport (344.4±238.0), footwear-clothing (320.6±246.7) and vitamin-like supplementary food (230.1±202.0). The indirect cost was estimated at US$5763.6; the highest average cost was for transport (US$98.3), followed by footwear and clothing (US$91.5), vitamin-like supplements (US$65.7), food (US$43.7), personal protective equipment (US$34.1) and communication (US$17.3) per year. The indirect cost of the COVID-19 contact tracing programme for health workers is shown in Table 2.

Table 2. Indirect cost for COVID-19 contact tracing program for healthcare workers.												
	Doctor/Dentist				Assistant Health Personnel				Total			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Vitamin-like supplement food	207,7	159,6	30,0	700,0	286,0	285,2	30,0	1000,0	230,1	202,0	30,0	1000,0
Transportation	408,1	248,1	24,0	1000,0	206,8	140,3	30,0	500,0	344,4	238,0	24,0	1000,0
Communication	65,6	55,8	10,0	200,0	46,0	24,4	15,0	100,0	60,7	50,2	10,0	200,0
PPE	152,5	149,2	35,0	500,0	53,6	22,5	25,0	100,0	119,5	130,0	25,0	500,0

Food	170,0	122,0	30,0	500,0	108,6	69,8	20,0	200,0	153,1	112,7	20,0	500,0
Shoes, clothes, etc.	356,3	295,7	100,0	1000,0	285,0	200,1	50,0	510,0	320,6	246,7	50,0	1000,0
Total	1930,0	633,98	1020,0	2450,0	1187,5	449,0	870,0	1505,0	1682,5	654,60	870,0	2450,0

Salaries accounted for the most important share of contact tracking programme costs (61.1%). After salary costs, the highest cost items were consumption (22.5%), indirect costs (8.3%) and transport (7.9%), respectively. The total cost of contact tracking with COVID-19 is shown in Table 3.

Table 3. Total cost of COVID-19 contact tracing

	Monthly			Annually		
	Total cost ₺	Total cost $	Percentage (%)	Total cost ₺	Total cost $	Percentage (%)
Fixture	692,0	98,8	1,7	692,0	98,8	0,1
Consumption	9085,0	1296,7	22,2	109020,0	15560,9	22,5
Transportation	3200,0	456,8	7,8	38400,0	5481,0	7,9
Salary	24640,1	3517,0	60,1	295681,0	42204,0	61,1
Indirect cost	3365,0	480,3	8,2	40380,0	5763,6	8,3
Total	40982,1	5849,6	100,0	484173,0	69108,3	100,0

Note: 1$(American Dolar) = 7,006 (Turkish Lira) in the study period

Türkiye requires an average of 1538 CT/filiation teams per year. The total cost of the contact tracing programme for the country was estimated at USD 106,288,565.4.

Discussion

In our study, the direct and indirect costs were calculated for the COVID-19 contact tracing programme (COVID-19CT) for a one-year period (11 March 2020 - 11 March 2021) in the Pursaklar district of Ankara. The contact tracing is a key element in the fight against COVID-19 (Bode et al., 2020) at a time when it requires budget extraction. The total cost of the COVID-19 contact tracing programme for the district was estimated at TL 484,173.0, of which 8.34% (TL 40,380.0) were indirect costs and 91.66% (TL 443,793.0) were direct costs. So far, no study has been published assessing the costs of COVID-19CT in another part of the country or in other countries, so we cannot conclude whether the costs are higher or lower than in other countries, but when we look at other studies related to disease management, the findings showed that direct costs were higher than indirect costs.[13,14,15,16] The highest cost was for salaries (61.1%) of the team, followed by wear/personal protective equipment (PPE) at 22.5% and then transport (7.9%). The single use of PPE leads to an increase in the cost of COVID-19 CT, based on WHO modelling it is estimated that approximately 89 million medical masks are needed each month to respond to COVID-19. For diagnostic gloves, this figure rises to 76 million, while international demand for goggles is 1.6 million per month.[17] During the pandemic, personal protective equipment (PPE) caused an increase in plastic pollution. In response to the high demand for PPE among the general public, healthcare workers and service workers, the production of disposable face masks in China increased to 116 million per day in February, about 12 times the usual quantity.[18] One of the main costs of CT was transportation, the team compiles a list of recent contacts of patients with coronavirus one by one, and then health departments arrange transportation for the team to visit patients with COVID-19 and their contacts in urban and rural areas. CT can identify potentially infected individuals before serious symptoms appear and, if done sufficiently and quickly, can prevent further transmission from secondary cases.[19] The Case and Contact Tracking Management Centre aims to identify cases and carry out the necessary referral process and ensure that the transport and follow-up of District Health Directorates is organised and coordinated, and that the contact is made as quickly as possible.[20] The contact tracing team is made up of dentists. While these dentists worked in the contact tracing programme, they lose performance pay as part of their dental services. The lost performance pay was not included in this study. There are several limitations to the study. Firstly, doctors and dentists could not receive performance pay due to their appointment to the CT/filing team, performance-based pay for doctors and densities were not calculated. Secondly, the annual national cost of the CT programme was one of the limitations due to the estimated cost based on the number of CT teams in the country. Finally, the drugs used for COVID-19 were not included in the costs because the drugs were not for sale, are distributed free of charge by the government, and the costs are unknown.

The total cost of the COVID-19 contact tracing programme for the district was estimated at US$69108.3, of which 91.7% (US$63344.7) was direct costs and 8.3% (US$5763.6) was generated by indirect costs. The highest cost was for team salaries (61.1%), followed by consumption (22.5%), indirect costs (8.3%) and transport (7.9%). The annual national costs for the CT team for 2020 were estimated at $106,288,565.4.

The study demonstrated the cost of the CT/filiation. The study outcome will help the policy makers to make decision in prevention and control of the infectious disease.

Ethical approval

The study was approved by Ankara YıldırımBeyazıt University Ethics Committee and got permission from the Ministry of Health, Türkiye.

Funding

This research received no grant from any funding agency

Conflicts of interest

The authors have declared that no competing interest

References

1. N. Mehmet, A. abed A. A. Al-Abed, M. E. Gökler, A. Elengoe, E. Ünal, and S. Mollahaliloğlu, "Knowledge, attitudes and practices regarding COVID-19 among the Turkish and Malaysian general populations during lockdown: A cross-sectional online survey," Ethiop. J. Heal. Dev., vol. 34, no. 4, pp. 243–252, 2020, [Online]. Available: https://www.ajol.info/index.php/ejhd/article/view/203220.
2. T. Ministry of Health, "Minister Koca reviewed Turkey's progress on its one-year fight against COVID-19," 2021. https://www.saglik.gov.tr/EN,80696/minister-koca-reviewed-turkeys-progress-on-its-one-year-fight-against-covid-19.html (accessed Sep. 10, 2022).
3. World Health Organization, "COVID-19,Türkiye Situation.," 2022. https://covid19.who.int/region/euro/country/tr (accessed Dec. 01, 2022).
4. D. M. Cutler and L. H. Summers, "The COVID-19 Pandemic and the $16 Trillion Virus," JAMA, vol. 324, no. 15, p. 1495, Oct. 2020, doi: 10.1001/jama.2020.19759.
5. A. Özlem and N. Mehmet, "Eating Habits Changes During Covid-19 Pandemic Lockdown," ESTÜDAM Halk Sağlığı Derg., vol. 5, pp. 169–177, 2020, [Online]. Available: https://dergipark.org.tr/tr/pub/estudamhsd/796735.
6. Ş. D. Kaya, Ş. D. Kaya, N. Mehmet, and Ş. Kerem, "Professional Commitment , Satisfaction and Quality of Life of Nurses During the COVID-19 Pandemic in Konya , Turkey," no. 1, 2022.
7. Nimetcan Mehmet Yağma, A.-G. Donkor, and M. Enes GÖKLER, "Management of Hospitals during COVID-19 pandemic," REWİE Med Res Rep, vol. 3, no. Supp 1, pp. 155–161, 2020.
8. World Health Organization., "COVID-19 Strategic Preparedness and Response Plan: 480 Operational planning guidelines to support country preparedness and response," 2020. .
9. Centers for Disease Control and Prevention., "Establishment and Management of Public Health Rapid Response Teams for Disease Outbreaks: COVID-19 Disease Supplement," 2020. .
10. World Heath Organization, "WHO strategic action and resource requirements to end the acute phase of the COVID-19 pandemic 2021," 2021. .
11. T.C. Sağlık Bakanlığı Halk Sağlığı Genel Müdürlüğü, "COVID-19 (SARS-CoV-2 ENFEKSİYONU) TEMASLI TAKİBİ, SALGIN YÖNETİMİ, EVDE HASTA İZLEMİ VE FİLYASYON," 2021. .
12. World Health Organization, "Pandemic influenza risk management: WHO interim guidance," World Heal. Organ., pp. 6–7, 2013.
13. V. Svihrova, M. Szilagyiova, D. Krkoska, K. Simekova, H. Hudeckova, and M. Avdicova, "Analysis of the direct and indirect costs of treatment of imported malaria in the Slovak Republic," Rev. Soc. Bras. Med. Trop., vol. 42, no. 4, pp. 377–380, Aug. 2009, doi: 10.1590/S0037-86822009000400004.
14. M. D. Dao, S. T. Nguyen, T. Van Ha, L. D. Pham, and T. Q. Vo, "Socioeconomic Burden of Communityacquired Pneumonia Associated Hospitalizations among Vietnamese Patients: A Prospective, Incidence-based Study," Asian J. Pharm., pp. 38–47, 2018, [Online]. Available: file:///C:/Users/AYBU/Downloads/2344-6372-1-PB.pdf.
15. R. Koris et al., "The cost of healthcare among Malaysian community-dwelling elderly," J. Ekon. Malaysia, vol. 53, no. 1, pp. 89–103, 2019, doi: 10.17576/JEM-2019-5301-8.
16. F. Salcedo-Mejía et al., "Economic Cost of Severe Acute Respiratory Infection Associated to Influenza in Colombian Children: A Single Setting Analysis," Value Heal. Reg. Issues, vol. 20, pp. 159–163, Dec. 2019, doi: 10.1016/j.vhri.2019.07.010.
17. WHO, "Shortage of personal protective equipment endangering health workers worldwide," 2020.

https://www.who.int/news/item/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide (accessed Apr. 16, 2021).

18. S.-L. T. F. Bermingham, "Coronavirus: China's maskmaking juggernaut cranks into gear, sparking fears of over-reliance on world's workshop," 2020. www.scmp.com/economy/%0Aglobal-economy/article/3074821/coronavirus-chinasmask-making-juggernaut-cranks-gear. (accessed Apr. 16, 2021).

19. M. J. Keeling, T. D. Hollingsworth, and J. M. Read, "Efficacy of contact tracing for the containment of the 2019 novel coronavirus (COVID-19)," J. Epidemiol. Community Health, vol. 74, no. 10, pp. 861–866, 2020, doi: 10.1136/jech-2020-214051.

20. A. Ç. Şimşek et al., "Contact tracing management of the COVID-19 pandemic," Turk Hij. ve Deney. Biyol. Derg., vol. 77, no. 3, pp. 269–280, 2020, doi: 10.5505/TurkHijyen.2020.80688.