



Bangladesh Health System's Response to COVID-19 during First Nine Weeks:A Rapid Study on the Key Building Blocks

Background

Like most countries in the world, the COVID-19 pandemic has given rise to a difficult and challenging situation in Bangladesh and demanded a country's healthcare system to incorporate critical and responsive measures to mitigate its dreadful outcome. In order to assess the responsiveness of the existing health system, the best approach is to consider the WHO's health systems framework in terms of six building blocks (service delivery, health workforce, health information systems, access to essential medicines, financing, and governance).¹ An attempt was taken to document and elucidate Bangladesh's health system responses to the surge of COVID-19 since its outbreak. The study mainly focuses on the responses in terms of service delivery, health workforce and governance with limited coverage on other building blocks of the health system.

Methodology

This rapid study used both a narrative and a quantitative approach for assessing the responsiveness of the Bangladesh Health system to COVID-19. Data were collected from several online sources (COVID-19 dashboard of Directorate General of Health Services (DGHS), IEDCR daily press briefings, COVID-19 situation reports published by World Health Organization-WHO) on preventive measures against COVID-19. These sources provided data on case detection, quarantine/isolation, treatment, human resources involvement, supplies and other arrangements. The data were analyzed to present the scenario of the capacity of Bangladesh health service delivery system. Besides, the study assessed the extent to which the WHO indications for tackling the pandemic COVID-19 protocol were followed by Bangladesh health system in terms of the building blocks. The study also reviewed news, reports in the newspaper. The time period considered was since the declaration of public health emergency in end December till 10 May 2020.

Highlights

- Since the COVID-19 is announcement as a public health emergency, the major challenge in screening had been insufficient human resources and logistical support to trace the returnees from abroad effectively and efficiently.
- The health workforce is skewed towards doctors with a ratio of doctors to nurses to technologists of 1:0.4:0.24, in stark contrast to the WHO recommended ratio of 1:3:5.
- Initially after the first case was detected, testing was restricted only to IEDCR with .03 tests per 10,000 population. With gradual involvement of other public and private sector facilities the testing rose 7.6 per 10,000, in the 9th week.
- Number of testing was disproportionately higher in Dhaka district compared to the rest of Bangladesh. On the 9th week of first case detection, test rate outside of Dhaka was only 2.8/10,000 inhabitants which was much lower than Dhaka (62.6/10,000) as well as the country average (7.6/10,000).
- Case detection rate remained above 10% after 12th April, indicating insufficient testing. The highest percentage value for Bangladesh was on March 18, with 40% case detection rate. Increasing the testing range is required to identify the undetected cases.
- During the case surge in mid-May, unlike the rest of the districts in Bangladesh, Narayanganj, Gazipur and Dhaka district didn't have enough isolation bed to treat the severely infected cases. The ratio of required to available number of isolation bed were 240:130, 67:35 and 1374:226 respectively.
- Patients needing care for other health condition were finding it difficult to get admitted in different hospitals and they were suspected of being infected with COVID-19.
- Shortage of PPE at the initial stage, delays in distribution among frontline overstretched health workers increased their vulnerability to infection.

KEY FINDINGS

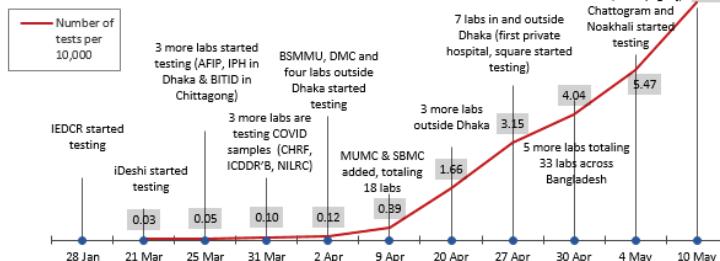
Screening

Since the announcement of COVID-19 as a public health emergency by WHO, screening process was at entry points were introduced. Among all 34 entry points in Bangladesh, only Shahjalal International Airport, Dhaka had active thermal scanner up to 2nd week of March. Later five thermal scanners were installed at another three international airports, one land port and one seaport. With insufficient human resources and logistical support, it was difficult to trace the Bangladeshi returnees from abroad effectively and efficiently.³

Testing for COVID-19

The ideal response in a communicable disease outbreak is to initiate testing for it as early as possible, leading to early identification of cases, quick contact tracing, early treatment and immediate isolation of infected people to prevent spread of the disease. At the beginning, sample collection and testing were restricted only to Institute of Epidemiology, Disease Control and Research (IEDCR) with small number of testing.⁴ After about two months since IEDCR started testing, the rate was only 0.03 per 10,000 inhabitants and during this period IEDCR was the sole organization conducting tests (Figure 1). In the meantime, the first COVID case was detected in Bangladesh on 8th March and two weeks later another public sector body, Institute for Developing Science and Health Initiative (ideSHi) started testing along with IEDCR. After that testing labs were being added in the list, the rate of testing yet remained very low. After a month of first case detection, the rate of test per 10,000 people remained less than 1 (0.39 tests per 10,000 inhabitants).

Figure 1:
COVID testing facility timeline, and tests per 10,000 population



Source: COVID-19: Bangladesh Situation Report NO.10 & Corona Info: Press Release

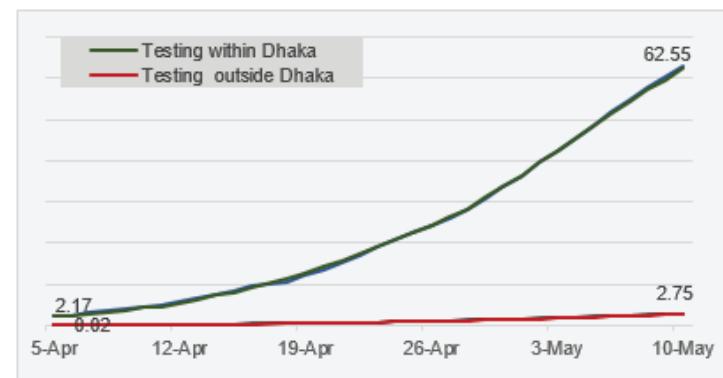
Though private sector is a major part of Bangladesh health system, until 26th April, nearly 3 weeks after first case detected, no private hospitals were involved in COVID-19 testing or treatment provision. Since 27th April, private hospitals started getting engaged in testing gradually and the rate increased to 7.66 per 10,000 population by May 10th, with 37 laboratories, both from private and public sector, conducting the test across Bangladesh at that point of time.⁴ Among those 37 labs, 18 were in Dhaka and other 19 were in other districts of the country.⁵ However, the test rate still remained alarmingly low compared to the huge population of Bangladesh which resulted in very low detection of many infected cases, causing quick spread of the disease.

Centralized Testing Facilities

Number of testing was disproportionately higher in Dhaka district compared to the rest of Bangladesh. As Dhaka had the highest number of positive detected cases in absolute term, the rate of testing was adjusted for the population to compare with areas outside of Dhaka. Figure 2 depicts the test rate per 10,000 inhabitants disaggregated for within and outside Dhaka. From 4th week of first case detection, test rate outside of Dhaka was only 0.02/10,000 population which was much lower than the country average (0.18/10000 population). Over time, though insufficient, the rate of the test in Dhaka reached about 62 tests per 10,000 inhabitants by 9th week (May 10).

On the other hand, barely 2.75 tests were conducted per 10,000 population in the areas outside Dhaka, which poses the stark difference of availability of testing facilities between Dhaka and rest of the areas of the country. Thus, even the higher test rate in Dhaka and the facilities being very centralized, it brought the overall country average to only 7.66 tests per 10,000 population (766 per million population).

Figure 2 Cumulative sample collection and test per 10,000 people in and outside Dhaka district

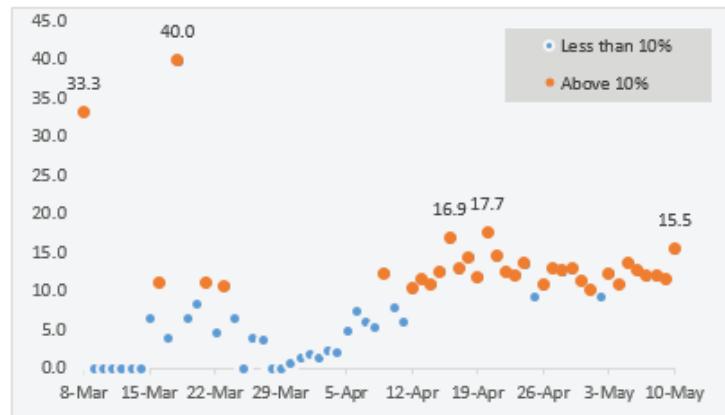


Source: Using data from Corona Info: Press Release

Testing Rate as Proportion of Positive Cases Detection

The test rate adjusted for population do not provide the full picture whether sufficient tests are done, as lower number of test may conceal the unidentified cases. In this regard, the Executive Director of WHO mentioned higher percentage of positive cases may indicate inadequate tests for the standard pool of population.^{6,7} With a similar note, epidemiologist William Hanage suggested that if less than 10% of the total tests comes positive, then it can be said that adequate testing are being conducted.⁸ Figure 3 depicts the percentage of case detection from tests, calculated for each day from March 8 to May 10. Earlier to the aforementioned period, no case was detected for total 111 tests till March 7. On the first day of case detection, the percentage of detection to tests jumped to 33.3 percent (3 positive cases out of 9 tests) from 0. The highest percentage value for Bangladesh was on March 18, with 40% case detection rate. Daily detection to case proportion even though fell by many percentage points, from April 12 to May 10, the percentage remained above 10, as depicted by orange dots in the figure.

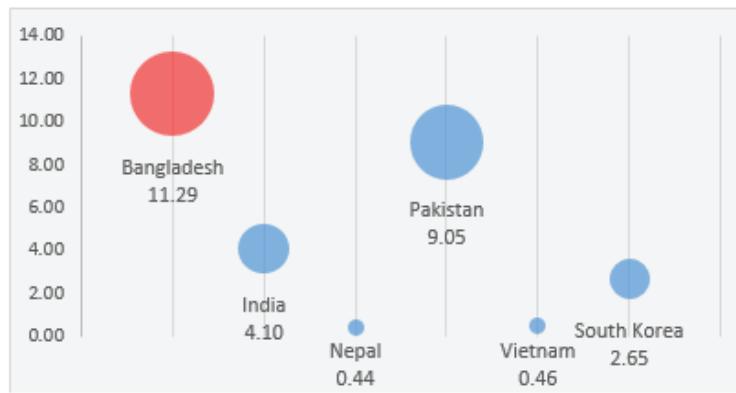
Figure 3 Percentage of confirmed cases to tests each day



Source: Using data from Corona Info: Press Release

Figure 4 depicts the cumulative comparison of positive case detection rate to tests conducted for India, Nepal, Pakistan, Vietnam and South Korea on their respective 9th week (64th day) like in Bangladesh. Among these countries, Bangladesh had the highest cumulative positive case detection rate of 11.29%, and Pakistan had a number near to that, whereas the better performing countries had the rate quite below 10%. This illustration points to the necessity of increasing test coverage in Bangladesh to be able to tackle the pandemic.

Figure 4 Percentage of confirmed cases to tests for different countries (cumulative) after 9 weeks of first reported case

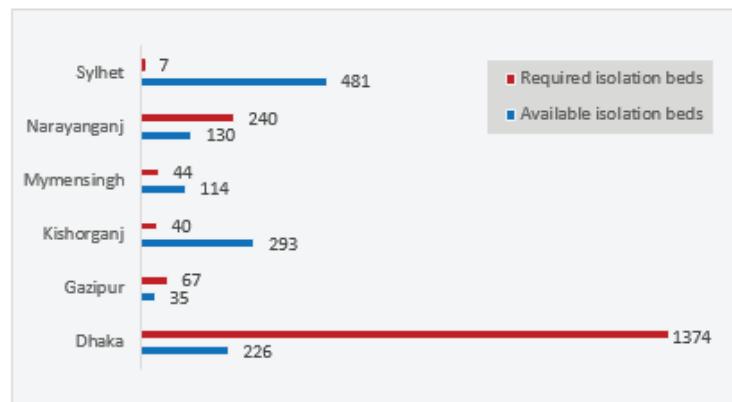


Source: Using data from "Our World in Data"

Facility Based Isolation Beds in Hotspot Areas

The number of available and required facility based isolation beds are presented in Figure 5. The required hospital isolation beds are calculated based on the WHO estimates of severe and critical case (20% of the infected cases needs hospitalization). Among the 64 districts in Bangladesh, all of them had more than the required number of isolation beds as on 10th May, except 3 districts. Dhaka, Gazipur, and Narayanganj did not have the capacity to institutionalize the COVID patients according to their severity. Within the hotspot areas, Dhaka had to increase isolation beds by over 500% (i.e. 226 to 1374) to accommodate all the detected COVID-19 cases. The highest number of isolation beds was available at Sylhet, which was 481 as there were low number of cases at that point of time. Such information needs to be shared among districts administration for any possible relocation of manpower and other resources.

Figure 5 Required and available isolation beds in some districts



Source Coronavirus COVID-19 Dashboard, 2020

Logistical Support for the Health Service Provision

It was reported that available necessary medical equipment for treatment of COVID-19 patients could not be utilized adequately due to shortage of necessary logistics and human resources. For example- load shedding and low voltage of electricity made it difficult to use ICU machines, lack of portable X-ray machines and dialysis machines, and sometimes absence of centralized supply of oxygen for ICUs were of major concern at the dedicated hospitals for treatment of COVID-19 patients.⁹ Earlier, some private sectors facilities expressed their inability to treat COVID-19 due to absence of necessary logistical support.¹⁰ A study conducted by Center for Policy Dialogue, based on Bangladesh Health Facility Survey 2017, suggest that among all the healthcare facilities in Bangladesh, only 5.1% had emergency transport system, 21.5% had alcohol based disinfectants, 27.5% had medical masks, 28% had all basic equipment, 34.5% had lab facilities, 43.1% had regular electricity facility, 55.1% had soap and running water facility, and only 86.3% had thermometer facilities. The surge of COVID-19 has made the situation worse, and the health system should have addressed this at the early stage.

Challenges in Service Provisions for Non-COVID Patients and other Health Services

The pandemic situation due to COVID-19 overwhelmed the health system of Bangladesh within the 8th week of first case detection. People with other health problems suffered due to closure of private hospitals and private medical chambers/private physician practices.¹¹ Patients needing care for other health condition were finding it difficult to get admitted in different hospitals and they were suspected of being infected with COVID-19.¹² In addition, due to the suspension of international flights, import of vaccines for Measles and Rubella were delayed affecting the supply and stocks.¹³ This made the health systems not maintaining the continuity of essential health services, and the government intervened with strict order and penalties to improve the situation.

Health Workforces and Their Vulnerability to Infection

The doctor-patient and nurse-patient ratios in Bangladesh were 6 to every 10000 population and 3.06 to every 10000 population, which was lesser than the other South Asian countries except Bhutan.¹⁴ Besides, the health workforce is skewed towards doctors with a ratio of doctors to nurses to technologists of 1:0.4:0.24, in stark contrast to the WHO recommended ratio of 1:3:5. Moreover, there is a misallocation of health-sector workers, with 78% of Bangladesh's population living in rural areas, while 70% of doctors are stationed in urban areas.¹⁵ During the pandemic COVID-19 situation, the health system was also experiencing scarcity of sufficient health workforce to tackle the situations such as; doctors and nurses with expertise in critical care, anesthesiologists, medical technologists and supported staffs.⁹ To handle the influx of COVID-19 patients, 2000 new doctors and 6000 nurses were recruited by the government near 7th week of first case detection.¹⁶ It was reported that many ICU beds were unoccupied due to absence of efficient human resources and medical equipment.⁹ Bangladesh, like many other countries of the world should mobilize intern/trainee doctor. There was shortage in number of medical technologist for conducting adequate testing. Though 30000 total medical technologists were unemployed in the country, there was no new recruitment by the government after 2008.⁹ This hampered the utilization of available diagnostic facilities. Efforts should be made to improve the efficiency of the recruited lab technologists and their provided training were also found not up to the standard.⁹

Besides, there were shortage of PPE at the initial stage, delays and irregularities in PPE distribution among frontline health workers increased the vulnerability of the frontline health workers to infection. There was evidence of the high number of infections among frontline health workers and police personnel.¹⁷ Till 4 May 2020, 565 doctors were evident to be infected by novel coronavirus.¹⁸ This situation reduced the effective amount of health human resources available for the care. Later the stocks of PPE increased.

Financing the COVID-19 response

The Government of Bangladesh (GoB) initially allocated BDT 50 crore and later again BDT 200 crore more for the Health Ministry to prevent the spread of coronavirus and ensure necessary treatment facilities for the infected patients at the end week of March.¹⁹ Moreover, special insurance of varied amount (5-10 lakhs depending on rank) and stimulus packages were allotted for doctors, nurses, and other health professionals as incentives for providing care to the COVID-19 patients.¹⁹ Besides in response to government initiatives, international donors also provided funds to the GOB for responding to the surge of COVID-19. For instance, the World Bank declared an aid of \$100 million for Bangladesh to fight against coronavirus after the first case detection in the country.^{20,21} On 7th May, the U.S. government, through USAID and CDC provided over \$22 million to complement the Government of Bangladesh's ongoing efforts to prepare and respond to the spread of novel coronavirus disease. Apart from these, Asian Development Bank (ADB) approved a \$100 million soft loan on 30th April and on 7th May again approved an additional \$500 million loan to support the government to combat the COVID-19 pandemic. Additionally, ADB also released a \$350,000 emergency grant for the procurement of medical supplies and equipment, and \$1.3 million from an existing project to provide

one-time cash support to 22,619 trainees to enable them to continue their ongoing skills training program. Sufficient funding was made available.²² Proper allocation and distribution (if necessary human resource) along with efficient and speedy procurement of necessary supplies is important to combat the crisis.

Governance

The GoB prepared a guideline for treatment of the COVID-19, named "National Guidelines on Clinical Management of Coronavirus Disease 2019". On 18 March, the GoB adopted the National Preparedness and Response Plan (NPRP) for COVID-19 with a total cost of USD 29,550,000 million.²³ On 22 March, the GoB joined the South Asian Association for Regional Cooperation (SAARC) initiative to fight the spread of the virus under a common strategy and committed to contribute USD 1.5 million to the SAARC COVID-19 Emergency Fund. At the secretariat level, the Ministry of Health and Family Welfare (MOHFW) was the principal authority and was accountable for planning, decision making and implantation of different strategies to tackle the current pandemic COVID-19. It collaboratively worked with other ministries and developed 11 committees.^{11,24} At the initial stage, the Institute of Epidemiology, Disease Control and Research (IEDCR) was predominantly responsible for surveillance and management of the pandemic COVID-19 up until 2 May, 2020.²⁵ On 27th April, the MOHFW gave the approval of conducting COVID-19 diagnostic test in a private hospital, and the private sector of the health system started to participate in management of COVID-19 patients. In addition, the law enforcement forces, like- police and army were responsible for provision of services to ensure quarantine for the people coming from abroad at facility quarantine, ensuring social distance among general people on roads and distribution of relief.^{26–28} However, the government also faced challenges to convince people to maintain social distance and wear mask while outside. A general holiday, instead of a "lock down" was declared effective from 26 March and as on 10th may it was extended six times as a part of the strategy to maintain social distance and enforce lockdown.^{29,30} On the contrary, denial was found among general people to obey the restrictions due their insufficient knowledge of the risk of going out and join a public gathering, the need to earn their livelihood, obtain food from relief distribution, or even joining protest rallies organized by the garment and transport workers.^{3,31–34} The major emphasis should continue to changes behaviour to enforce use of mask, restricting social gathering and maintaining physical distances in public places.

CONCLUDING REMARKS

Bangladesh health system faced a serious challenge to prepare for dealing with COVID-19 pandemic. Adoption of systematic screening and contact tracing measures could have mitigated the extent of disease surge in the country and this continue to remain as a key aspect to fight the spread. The COVID-19 pandemic actually made the resource scarcity, inconsistencies and lack of coordination more apparent and pointed out the necessity of overhauling the overall health care system of Bangladesh. The impaired arrangement of screening at entry points of the country, and challenges in tracing the returnees from abroad and inadequate testing are major reasons behind the spread of the COVID-19 infection. Furthermore, the scarcity of human resources and lack of proper protective measures made it challenging to tackle the COVID-19 situation. Absence of decentralization in management of all health facilities across the country and shortage of necessary medical equipment and other logistics are of major concern. The government should

consider using emergency law and arrangements in combating the spread of infections and changing behaviour of the people. Prompt decision making and policy implementation according to the regional need, recruitment of adequate skilled health workforce, and increased rapidity in procurement of standard medical equipment are recommended. It is essential that we need to strengthen the capacity of essential public health services to enable emergency response and also maintain continuity of essential services while freeing up capacity for COVID-19 response at the health facilities. A comprehensive assessment of the health systems building blocks was not possible during the short period of this rapid research. It was not possible to obtain other necessary data, e.g. data on specific medical equipment, number of trained health-workforce for treating COVID-19 patients across the country.

Reference

1. WHO. Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies. Geneva; 2010.
2. New Age. Government widen measures as panic grip nations. The New Age. March 2020.
3. Prothom Alo. Keeping them in home is becoming difficult. Prothom Alo. March 2020.
4. WHO. COVID-19: Bangladesh Situation Report NO.10.; 2020.
5. WHO. COVID-19 Situtaion Report for Bangladesh-11. World Heal Organ. 2020.
6. NPR. If Most Of Your Coronavirus Tests Come Back Positive, You're Not Testing Enough. Coronavirus Live Update. March 2020.
7. WHO. Media briefing on COVID19 with Dr. Tedros. 2020.
8. NPR. Which States Are Doing Enough Testing? This Benchmark Helps Settle The Debate. National Public Radio. April 2020.
9. TBS. Ill-equipped, Bangladesh finds it hard to battle Covid-19. The Business Standard. April 2020.
10. TBS. Private hospitals unable, unwilling to treat coronavirus patients. The Business Standard. March 2020.
11. Prothom Alo. Entire govt. is associated with Corona Prevention. The Prothom Alo. April 2020.
12. New Age. Kidney patient died due to lack of treatment in Jashore. New Age. April 2020.
13. Prothom Alo. Regular vaccination process is closed, children are at risk. Prothom Alo. April 2020.
14. Alam A. Patient, doctors, nurses ratio: Bangladesh lags far behind its neighbours. Dhaka Tribune. July 2019.
15. UNDP. Covid-19: A reality check for Bangladesh's healthcare system. United Nations Dev Progr. 2020.
16. TBS. Govt to recruit 2,000 doctors and 6,000 nurses. The Business Standard. April 2020.
17. Prothom Alo. 8% of the total infected are police. The Prothom Alo. March 2020.
18. UNB. Coronavirus: 565 doctors infected in Bangladesh. United News of Bangladesh. May 2020.
19. DT. Coronavirus: Govt allocates Tk200cr more to Health Ministry. Dhaka Tribune. March 2020.
20. TBS. Govt allocates Tk100 crore to fight coronavirus. The Business Standard. March 2020.
21. The United States Government Provides Over \$22 Million for Fighting COVID-19 in Bangladesh. US Embassay bangladesh. May 2020.
22. ADB Approves \$500 Million for Bangladesh's COVID-19 Response. Asian DevelopmentBank.<https://www.adb.org/news/adb-approves-500-million-bangladesh-covid-19-response>. Published May 7, 2020.
23. Azad AK. National Preparedness and Response Plan for COVID-19, Bangladesh.; 2020.
24. Prothom Alo. All the committees have not started work yet. Prothom Alo. March 2020.
25. Prothom Alo. IEDCR is conducting tests in stock. The Prothom Alo. May 2020.
26. TBS. Quarantine centre will be built at Tongi Ijtema ground: Health minister. The Business Standard. March 2020.
27. New Age. Strict shutdown enforcement in city. New Age. April 2020.
28. New Age. No test facilities outside Dhaka, Chattogram. New Age. April 2020.
29. New Age. Islamic Foundation for following WHO directives on coronavirus victim burial. New Age. March 2020.
30. Prothom Alo. Risky Shibchar got lockdown. Prothom Alo. March 2020.
31. New Age. RMG workers protest against factory layoff. New Age. April 2020.
32. New Age. People block roads for relief. New Age. April 2020.
33. New Age. More people rush outdoors as shutdown slackens in Bangladesh. New Age. April 2020.
34. New Age. Uttara Quarantine facility hold as residents protest. New Age. April 2020.

Prepared by

Zahidul Quayyum, Farzana Tamanna Ummey Shaon,
Ayesha Ahmed, Baby Naznin, Prianka Sultana Hema,
Monybur Rahman

**BRAC James P Grant School of Public Health
BRAC University, Dhaka**