REVIEW ARTICLES

CRISIS MANAGEMENT CELL FOR MONITORING COVID-19 SITUATION IN PAKISTAN ARMED FORCES – A CASE STUDY

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ABSTRACT

'Reporting and monitoring systems cannot be hurriedly cobbled at the first sign of an impending emergency'. Crisis Management Cell was established on 29 January 2020 as part of the Medical Directorate COVID-19 response strategy with a mandate to act as a data collection point & repository for relevant decision making and policy formulation.

Since its inception, it has proved its mettle by enabling a paradigm shift from an existing traditional passive surveillance system to an active, near-real-time data collection and dissemination arrangement. This transition involved a whole-hearted commitment of top brass and a herculean effort on part of Crisis Management Cell. Its functioning non-stop, 24/7 on war-like footings for attaining assigned objectives has been highly appreciated by all rank and file.

By writing this case study, authors intend to share the work done by Crisis Management Cell for nearly seven months. By narrating a tale of blood, sweat and tears the purpose is to critically review the Crisis Management Cell structures, processes and outcomes. We provide insightful lessons and discerning tips based on our first-hand experience of what went well, what did not, and what could. The purpose is not only to highlight its distinctive work but also to highlight that the tasks were performed at break-neck pace.

We conclude by commenting on the utility and effectiveness Crisis Management Cell in achieving the desired output which is also evident from the fact that its initial mandate pertaining to COVID-19 was expanded later to include Dengue Surveillance and Disease Early Warning System.

Keywords: COVID-19, Crisis management cell, Database, Data collection, Data management, Data repository, Disease dashboard, Disease surveillance, Reports & returns, Situation report.

INTRODUCTION

COVID-19 will invariably go down in history as the most important pandemic mankind ever wrestled with[1]. The disease has single handedly managed to strong-arm modern medicine into an anguishing check, eluding scientists everywhere. As of today, what began as an isolated outbreak in China has since manifested into a rampant pandemic. The COVID-19 crisis has brought the healthcare systems of the world to their knees, highlighting their faults and fragility.

Crisis resilient healthcare systems are considered to have the following four properties. They are able to:

1. Anticipate any occurrence of a deviation
2. Monitor and maintain control of their operations during the deviation
3. Respond when the deviation is there
4. Learn from the occurrence of the deviation[2]

Disease surveillance constitutes the bedrock of response to epidemics[3]. The objective of instituting prevention and control measures requires a systematic and continuous collection of data on diseases and their associated factors. The analysis of time, place, and person distribution of diseases helps in determining their existing and future trends in different population subgroups, locations and time periods[4].

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It is necessary to plug all gaps caused by the absence of high-quality scientific data, which otherwise get filled by 'anecdotal reports, contradictory statements, and misinformation.'[5] Good monitoring and reporting systems are data-driven, simple, complete, sensitive, timely and acceptable[6].

No surveillance system can claim perfection. All existing systems have room for improvement. Pandemics provide a lot of opportunities in their wake. For example, Chinese disease early warning systems improved greatly since the Severe

CMC was established in a good-sized room located on the 4th floor of the modern, state of-the-art, In-Patient department of Pakistan Emirates Military Hospital (PEMH). However, it had capacity for future expansion since adjoining rooms were available. When COVID-19 patients started reporting at PEMH, CMC was relocated at another site within the hospital. Later, when PEMH was declared a COVID-19 designated hospital, CMC was moved to its present location in the Training Wing of Armed Forces Post Graduate Medical Institute (AFPGMI). Hospitals and

Table-I: Pros & cons of locating disease data collection cell at different settings

	Hospitals	Training institutions
Functioning	Round the clock	Working hours only
Administrative support	Readily available 24/7	Working beyond hours requires much administrative support
Resource requirement	Not Much	A lot
Public Health Department	Not available	Available
Specialists	Available	Not available
Risk of hospital acquired infections (HAI)	Present	None

Acute Respiratory Syndrome (SARS) outbreak in 2003 and the Netherlands improved theirs after Q fever outbreak in 2007-09[7].

Evidence exists that reporting and monitoring systems cannot be hurriedly cobbled at the first sign of an impending emergency[6,8]. However, the matter was deliberated upon at the highest echelons, and on 29 January 2020, it was decided that a Crisis Management Cell (CMC) would be established as part of the GHQ Medical Directorate COVID-19 response strategy to operate 24/7 as their emergency duty room. The Cell was envisaged to function on war-like footings for monitoring near-real-time COVID-19 situation in Armed Forces. The vision involved acting as a data collection point & repository on the basis of which decision making & policy formulation for COVID-19 could be materialized.

Location

"We require from buildings two kinds of goodness: first the doing their practical duty well: then that they be graceful and pleasing in doing it." ~ *John Ruskin*

training institutions have considerably different dynamics which are shown in table-I.

Lesson: Carefully weigh the pros and cons when selecting a data collection and repository center's location. One of the issues faced due to the frequent change of location was CMC's OAS id/ hierarchy, for which frequent requests had to be made to relevant authorities.

Tip: *"We shape our buildings; thereafter, they shape us."* ~Winston Churchill

Infrastructure

"Move fast with stable infrastructure." ~Mark Zuckerburg

The room in which CMC was founded, housed a table, a few chairs, a PASCOM phone, an intercom, whiteboard with stand, and an LCD TV. Presently CMC comprises 2 x rooms. One is the CMC office, and the other is used as sleeping quarter for officers on as required basis due to 24/7 functioning. The office has individual work stations with laptops/desktops and phones. LCDs screens have been installed to increase

efficiency, keeping the workflow in view. Current CMC inventory is as per table-II:

Lesson: To ensure efficiency in meeting urgent demands, PEMH administration, allowed petty cash maintenance at the time of CMC inception, for reimbursement later. Thereafter inventory and demand registers were maintained which were checked on weekly basis. In an ad-hoc arrangement, it is essential to maintain good

ners, and 1 x Aya. Since Post-Eid-ul-Fitr surge demanded an additional augmentation of HR, 5 x Officers (Non-Public Health) were also attached in quick succession to work in CMC.

Lesson: HR management goes beyond caring for one's team. It also involves having tough conversations about their performance. CMC comprised of individuals attached from various outfits. They were not permanently posted and

Table-II: Current CMC inventory.

Inventory Head	Items details
Stationery items	Pens, Pencils, Erasers, Sharpeners, Staplers, A-4 size paper reams, White boards with markers & stands, Paper clips, Scissors, Tapes of different colors, Highlighters, Markers, Files, Soft boards
Electronics	Multimedia, 4 x LCD TVs, Antivirus, USB drives, Calculators, Scanner, Fax machine, HDMI cables, Laptops, Desktops, Antivirus, Printers, Extension wires, Call bell
Tele-communication	Designated mobile phone, Landline, Intercom, PASCOM, Dual internet connection
Refreshments	Tea/ food arrangements especially during Ramadan, Water dispenser, Microwave oven, Crockery, Cutlery
Miscellaneous items	Beds, Bed linen, Working desks, Computer tables, Tissue papers, Insect repellents, Mosquito coils, Electric Insect killers, Hand sanitizers, Panaflex

working relations with who is/are responsible for all processes including but not limited to safety and security (especially at night and during evening), installation of CCTV cameras, biometric attendance, HR discipline and leave sanctioning, office & equipment maintenance, procurement of items (frequency along with provision timelines), food provision mechanism during Ramadan, backup for power outages, linen washing, etc.

Tip: *"Infrastructure is much more important than architecture."~Rem Koolhaas*

Human Resource (HR)

"When people go to work, they shouldn't have to leave their hearts at home."~Betty Bender

At inception, CMC organizational hierarchy comprised of 1 x Head of the Department (HoD) and 3 x Members. By the time COVID-19 PCR positive confirmed cases started reporting at PEMH, the HR was further strengthened with the attachment of 4 x Public Health Officers (PGRs) of whom 2 were also qualified in Frontline Field Epidemiology Training Program[9] (FELTP), 3 x Public Health Assistants (PHAs), 2 x office run-

hence demonstrated variable levels of commitment. Moreover, their qualifications, competencies, training, and departmental background varied. Providing leadership, maintaining discipline and lifting morale of such a heterogeneously constituted, project-assigned team was challenging. A culture of mutual trust, fairness, camaraderie, equitable distribution of work, and accountability had to be created[10]. Bridging the gap in existing and desired competencies of the team demanded investing in team's capacity building[11]. For this purpose, OAS and MS-Excel training and refresher sessions were conducted for staff. It is envisaged that CMC output could have improved further if services of a Statistician were also made available.

Tip: *"In order to build a rewarding employee experience, you need to understand what matters most to your people." ~Julie Bevacqua*

Scope of Work

"To really change the world, we have to help people change the way they see things." ~Suzy Kassem

In line with its mandate, CMC crafted its own terms of reference (TORs) and individual job descriptions (JDs). Broadly the mandate included:

- Actively collecting Armed Forces COVID-19 data from all hospitals/HQ Log Corps & sister services

- Disseminating near real-time relevant information to Medical Directorate

- Carrying out literature review on assigned topics

- Monitoring national & international trends

- Carrying out weekly analysis of COVID-19 data

- Maintaining lists of Health Care Workers (HCWs), Deceased, Vent, Clusters and Novel therapies

Lesson: Policymakers' needs for evidence vary depending upon the context, resource availability, and the specific phase of the epidemic[12]. CMC proactively took it upon itself to bridge the

Stakeholders

"*A true architect is not an artist but an optimist realist. They take a diverse number of stakeholders, extract needs, concerns and dreams, and then create a beautiful yet tangible solution that is loved by the users and the community at large. We create vessels in which life happens*". ~Cameron Sinclair

Work at CMC started off by maintaining a detailed telephone directory containing the contact numbers of all stakeholders who were categorized as follows:

- Upstream recipients received data collected by CMC e.g. GHQ, Medical Directorate.

- Downstream recipients provided their data to CMC and were further divided as:

  o Frontline responders: PAF, PN, CAF, DMS Log Corps

  o Hospital/Unit focal persons: All hospitals, AFIP, AFIRM, etc

The channels of communication used with

Table-III: CMC channels of communication used with different stakeholders.

Stake holders	Channel of communication	Input
All DMS HQ Log Corps	OAS ltr	All Corps wise state
All CMH focal persons	OAS ltr	All CMH wise state
PEMH call manager	SMS/ Phone	PEMH daily admission state
PEMH focal persons	SMS/ Phone	PEMH daily discharge state
AFIRM ward master	SMS/ Phone	AFIRM facility state
PAF focal person	SMS/ Phone	PAF daily SitRep
PN focal person	SMS/ Phone	PN daily state
AFIP focal person	OAS ltr	AFIP daily positive cases
AFIP focal person	OAS ltr	AFIP daily tests conducted & positive cases from all COVID-19 testing facilities

context-specific knowledge gap to enable priority setting. This task was amicably performed despite initial difficulties. It is better to have a clear cut mandate[13] from the very start to avoid future embarrassments. The scope of work can be gradually increased, keeping in view the evolving situation.

Tip: "*Establish your system of control to see that your team does their job*". ~Sunday Adelaja

different stakeholders are depicted in table-III.

Lesson: It is important to develop a rapport with all stakeholders[14]. This is nurtured through frequent in-person meetings and telephonic dialogue. It is essential to know the upstream data recipients' expectations. It is also pivotal to have situation awareness of downstream data recipients' workload and the difficulties they encounter while assimilating data at their end.

Tip: *"Understand stakeholder symmetry: Find the appropriate balance of competing claims by various groups of stakeholders." ~Warren G. Bennis*

Duty Rosters

"I know the price of success: dedication, hard work, and an unremitting devotion to the things you want to see happening." ~Frank Lloyd Wright

Due consideration had to be given to official leave policy, staff requirements, religious obligations like Ramadan, Eids, Muharram and other gazetted holidays, while formulating duty rosters. Flexibility was adopted wherever possible which enabled amicably handling interruptions in the working schedule when few staff members

to perform duties on 12 hourly basis as well. This usually happened on closed holidays & weekends. The usual shift pattern is shown in table-IV.

Lesson: Ensure fairness and accountability[15] in the system, especially when assigning duties to the team duly ensuring equitable distribution of work without overburdening any team member.

Tip: *"Establish a system of rewards and punishments." ~Sunday Adelaja*

Shift Work

"Due to unfortunate circumstances, I am awake". ~Anonymous

Table-IV: Shift timings & manning level.

Shift	Morning	Evening	Night
Time	0800-1500 hrs	1500-2100 hrs	2100-0800 hrs
Officers	2	2	2
Clerks	3	3	3

Table-V: Shift tasks.

Morning	Evening	Night
• Get CMC disinfection done • Update surveillance boards, epi curve, and map • Update main database • Do Corps-wise audit • Add daily AFIP cases in SitRep • Update counts in SitRep • Do preliminary investigation of clusters • Perform GHQ assigned tasks • See and mark OAS mail • Turn on LCD for media watch, Worldometer, etc • Address administrative issues • Acquire demanded items • Apprise HOD regarding new developments • Update CMC presentation	• Add new cases of all Corps from OAS • Update facility-wise table counts for all Corps in SitRep • Countercheck new cases in all Class A hospitals	• Add new cases of PAF & PN in SitRep • Consult websites for newly reported cases in various countries[16] • Formulate and verify SitRep by 0500 hrs & send for final approval • Finalize One Pager by 0500 hrs & send for final approval • Update PEMH slide by 0500 hrs & send for final approval • Maintain hard and soft copies of every work output • Print out of approved SitRep & One Pager in relevant folders & paste on hardboard.

turned out positive for COVID-19, others proceeded for completion of their theses requirements and yet others had to be reverted to their parent units in a phase-wise manner when roll back from COVID-19 situation started. Three shifts per day were followed however, there was no dearth of days when individuals had

The COVID-19 dreary times demanded a lot of patience, agility, and poise[12]. CMC team worked in morning, evening, and night shifts. The individuals on evening and night shifts were tasked with Situation Report (SitRep) formulation. When the SitRep frequency was reduced, the night team spent sleepless nights for SitRep

preparation, verification & approval. Detailed tasks assigned to each shift are shown in table-V.

In all shifts, the common tasks included maintenance of shift log, manning CMC telephone lines, and signing shift handover.

Lesson: It is important that all individuals are clear about their own as well as others' roles and responsibilities[17].

Tip: "*Start by doing what's necessary, then what's possible, and suddenly you are doing the impossible.*" *~Francis of Assisi*

Work Products

"Do not let what you cannot do interfere with what you can do." ~John Wooden

CMC was instrumental in drafting the Armed Forces Action Plan (AFAP) Interim version. However, once COVID-19 cases started pouring in, CMC redefined its reports and returns as follows:

- **SitRep:** It was started after a month of CMC inception when hospitals reported seeing COVID-19 suspected cases. This was sent to upstream recipients twice daily as the Morning and Evening SitRep. This practice continued for four months and thereafter it was only sent in the morning in addition to One-pager Summary Statistics. PEMH summary of the last 24 hours was also compiled which was an only COVID-19 designated hospital.

- **A weekly analysis report:** It was formulated every Sunday as a weekly round-up.

- **Various tasks assigned by Directorate and DG CMC:** These were performed on as-and-when-required basis and included:

  o **Comparing & contrasting** old pandemics, N-95 vs. masks vs. others, open vs. closed Garrisons, OPD policies of UK & USA hospitals, WHO vs. CDC guidelines, countries data etc.

  o **Desk reviews** on the role of BCG, temperature, humidity, Dengue/Malaria, Chloroquine, Plasma, Stem cells.

o **Preliminary Cluster investigation.**

o **Alert generation.**

o **International, National and Armed Forces comparisons** regarding confirmed cases, discharges, deaths, home-care, recoveries, ventilator status, HCWs, novel therapies compiled in a variety of ways i.e., Corps wise, health care facility wise, entitlement status wise, category (serving & retired clientele) wise, etc.

o **Pakistan related analysis** included re-infection rates, Irani Zaireen, Tableeghi Jamaat, death rate, birth rate, and growth rate.

o **Foreign country related analysis** included an increase in the number of deaths in Iran, UK, causes of low CFR in Germany, comparing & contrasting UK, Germany, USA, Italy, Iran, India, good vs. bad case scenarios, will Pakistan do better? Taiwan 122 actionable steps, a resurgence of COVID-19, selected country recovery rates.

o **Queries** like how many lab testing kits need to be demanded? Is mechanical ventilation recommended management for ARDS? Why Pakistan's COVID-19 epi curve is shaped the way that it is? etc.

o **Research proposals** for PAFMJ upcoming COVID-19 issue.

o **Miscellaneous tasks** were also performed:

✓ Health education posters for patients' & attendants' on instructions on home-care, point-of-care, quarantine, COVID-19 Health Promotion / Disease Promotion, etc

✓ Simulation training for officers (on-site)

✓ Lectures (on & off site)

✓ Training of PHAs

✓ Booklets based on WHO, CDC & National Action Plan (NAP) guidelines

✓ Booklets on WHO posters

✓ Repository of journals having articles on COVID-19

o **Tasks that were performed for a short while but discontinued later:**

✓ TV/ media alerts

✓ Facility preparedness

✓ Hospital bed-state data

✓ COVID-19 Narrative

Although contact tracing was never a part of CMC mandate, however, 3 x working models were developed in anticipation.

Lesson: Defining reports & returns entails determining the purpose, contents, format, and frequency of data collection[18]. All work products must be thoroughly deliberated upon at the inception stage, and consensus of stake-holders attained keeping room to cater to newer and unprecedented outputs.

Tip: *Do not bite off more than you can chew. ~Idiom*

Data Collection & Management

"If we have data, let's look at data. If all we have are opinions, let's go with mine." ~Jim Barksdale

Health data is a resource, and rapid data sharing is the basis for public health action[19]. However, data collection is a tedious job[20] which subjects the staff to immense hardship and sacrifice. The issues increase manifold, keeping in view the number of reports and stakeholders, level of detail required, frequency etc.

Routinely, CMC received data on twice-daily basis from downstream recipients which was recorded into a database, updated and integrated into the daily and weekly work products.

For sentinel events (serving officer on vent or death), a message from focal persons would be received on CMC official phone. It would then be verified from frontline staff. At times it would occur in the reverse order, but the information would be received nonetheless. After establishing the authenticity of the information, the event would be communicated to higher authorities within 2 hours via the fastest possible means using telephone call, SMS, or fax and also noted for incorporation in SitRep. This country-wide

near-real-time reporting significantly increased surveillance timeliness.

Initially the database was maintained[21] on MS-Word; however, as the number of cases increased, MS-Excel was adopted after a lot of brainstorming on the agreed upon template in which customized drop-down menus were incorporated for ease of end-users.

Data on a reasonable set of elements representing demographics, disease severity, co-morbidities, and outcomes was collected. Keeping the end-user workload in view, it was kept parsimonious and details of prior medical histories, current medications, procedures, etc were not recorded.

Lesson: Transformation of a passive surveillance system to a near-real-time reporting forum was a herculean effort[22]. The challenges included meeting upstream recipients' expectations, catering to the downstream recipients' problems, and enhancing own staff competence in using MS-Excel. It is necessary to keep back-up of all hard & soft folders of work outputs. For safe custody, have password-protected folders and place hard folders under lock and key.

Tip: *"Without big data, you are blind and deaf and in the middle of a freeway." ~Geoffrey Moore*

COVID-19 Dashboards

"The number one benefit of information technology is that it empowers people to do what they want to do. It lets people be creative. It lets people be productive. It lets people learn things they didn't think they could learn before, and so in a sense, it is all about potential". ~Steve Ballmer

As the saying goes, 'a crisis provides an opportunity.' This COVID-19 pandemic is indeed a great opportunity for digital technology[23]. Real-time reporting is fast becoming the norm in organizations which desire to make timely and data-driven decisions with no delay in the delivery of information. These include financial institutions, utilities, telecommunication, healthcare, hospitality industry, customer service, etc. Automatic reporting systems have improved

timeliness of reporting, prompt dissemination of information, and coordination of response operations[5].

Lesson: If data is not entered correctly, a domino effect occurs, and wrong information spreads across the entire organizational database and does not remain limited to one isolated spreadsheet[24]. In the fight against COVID-19, technology needs to be seen as an ally. In today's day and age, not using real-time dashboards is an ill-afforded option. Digitizing the electronic dashboard for real-time data collection is the only way forward.

Tip: "*Dashboard is a practical tool to improve management effectiveness and efficiency, not just a pretty retrospective picture in an annual report.*" ~*Pearl Zhu*

CONCLUSION

CMC endeavored not to lose sight of chalked out priorities and spelled out needs. It tried to remain objective, neutral, transparent, and truthful in the evidence and recommendations generated. It was useful and effective in achieving the desired output. It was heartening to note that keeping its work output in view; the initial mandate which revolved around COVID-19 only was expanded to initially include Dengue surveillance, and later the entire Armed Forces Disease Early Warning System (DEWS). Few recorded compliments which were sent CMC way are as follows:

"*CMC has enabled GHQ Medical Directorate to monitor the pandemic and recommend timely interventions*"

"*Data gathered at CMC has proved valuable in understanding various aspects of the disease and develop a futuristic framework for Armed Forces response in general and Army Medical Corps preparedness in particular.*"

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CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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