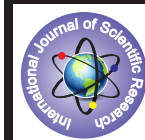


Impact of September 2014 Floods in Kashmir on Functioning of Major Hospitals of Srinagar with Special Reference to Impact on Lone Surviving Tertiary Care Hospital



Medical Science

KEYWORDS : Health Care Delivery, submerged, capacity building, supplies, communication

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ABSTRACT

Introduction: The role of hospitals in the community response to disasters has received increased attention in recent times. Hospitals must be prepared to respond to and recover from all hazards, emergencies and disasters. In Kashmir during September 2014, it rained heavily which resulted in a major flood in Kashmir. 50% of Srinagar (summer capital of Jammu & Kashmir) was under floods. Methodology: A Retrospective review of sequence of events during the period of flood and aftermath was carried from 4th Sept 2014 to Nov 2014. Observations: SKIMS which is a 780 bedded hospital and JLN which is a 150 bedded hospital were unaffected while all other hospitals of Srinagar were submerged. Emergency registration during the month of flood at SKIMS was about 46% more than average for the year while as during October it was about 39% more than the average. Emergency inpatient admission was 34% more than the average during September 2014 while as it was 58% more than the average during October 2014. Capacity building in terms of availability of beds was a major challenge. Though SKIMS had to open new areas for patient care, staffing was not a problem during first half of September as good percentage of staff members who were putting up within the campus performed extra duties. SKIMS not only met its own requirement of medical and surgical supplies but also provided some supplies to other hospitals. Patients were out of money. Many of the health care personnel who were supposed to be initial responders at the time of disaster were victims themselves. Conclusion and recommendations: As capacity building in the form of creating extra beds to manage increased influx of patients is a challenge, hospitals should have a laid down plan for creating extra beds. Hospitals should organize in house emergency medical teams to ensure that adequate staff is available at all times to handle emergency casualties. There are challenges concerning how to share information and coordinate overall activities among multiple response teams.

INTRODUCTION

The role of hospitals in the community response to disasters has received increased attention in recent times. Hospitals must be prepared to respond to and recover from all hazards, emergencies and disasters. (1) The role of the Ministry of Health, Labour and Welfare in a disaster includes securing medical and nursing care, providing public health services and ensuring the safety of food and water supplies (2). In recent times there have been number of such disasters which have stressed the fragile health care delivery systems i.e. earthquake striking eastern Japan on 11th March 2011 and triggering a tsunami (3). Leh in Ladakh region of Jammu and Kashmir in North India on 6th August 2010 being washed by flash floods due to cloud burst and causing loss of human life and destruction (3), February 2013 floods of Mozambique (4), floods of Uttarakhand India during monsoon season 2013 (5). In Kashmir during September 2014 incessant rains resulted in a major flood in Kashmir from 4th September onwards. By 7/9/14 50% of Srinagar (summer capital of Jammu & Kashmir) was under floods, while most of the south Kashmir had submerged. Roads were submerged, communication lines like cellphones, telephone landlines were down, and Radio Kashmir and Doordarshan Srinagar was submerged, hampering transmission from 7th sep 2014. Most of the Srinagar city were under fifteen to twenty feet of water. Srinagar city has a sole tertiary care hospital SKIMS (Sheri-i-Kashmir Institute of Medical Sciences) and secondary care hospitals like SMHS, G B Panth Hospital (children hospital), Bone and Joint Hospital, SKIMS Medical college Bemina, JLN hospital (managed by directorate of Health). Out of these hospitals SKIMS a 761 bedded hospital and JLN a 150 bedded hospital were unaffected while all other hospitals were submerged. This badly affected delivery of health care in Kashmir which necessitated to carry out retrospective review to study the impact of these floods on health care delivery with special reference to SKIMS.

Methodology

A Concurrent observational study and retrospective review of records was carried from 4th Sept 2014 to Nov 2014. The materials for study included inpatient records, Hospital Statistics, orders, circulars, Govt press briefing's and interviews with various hospital functionaries. Interventions wherever felt necessary were made.

Observations

Review observations were interpreted in the form of Impact and Responses.

Impact on Health Infrastructure

The devastation of healthcare system of the state was probably the biggest casualty of the floods. As floodwaters entered the hospital premises and submerged several floors of four out of the five major hospitals situated in Srinagar. They were completely shut down. From these hospitals the early evacuation was started and patients were shifted to functional hospitals in the city, mainly Sheri-Kashmir-Institute-of-Medical-Sciences (SKIMS) - which is a large tertiary care teaching hospital in the J&K. (6) Some patients were shifted to 50-bedded Gupkar Nursing Home and 30 bedded Maternity Hospital Sanatnagar. Shri Maharaja Hari Singh (SMHS) hospital, one of the large premier hospitals of the state was completely defunct for over two weeks as the hospital beds, medical and diagnostic equipment and hospital transport were rendered useless due to the floodwaters. The patients from SMHS were evacuated on the first day of flood and taken to other non-affected hospitals in boats while some stayed trapped in the floors above. The Lalla Ded Maternity Hospital, GB Pant Hospital (valley's lone pediatric hospital), Bone and Joint Hospital, SKIMS Medical College, Bemina were all severely affected by the flood water and were forced to shut down. Most of the diagnostic equipment including Ultrasound, CT Scan, MRI, Radiotherapy equipment, Ventilators, Oxygen Concentrator plants, Colour Doppler, ERCP machine, Autoclaves, PCR, Autoanalysers and other laboratory equipment, Operating Room tables, power generators and blood banks got destroyed in the floods.

Impact on Health of population

People were badly affected, especially those with chronic diseases, such as, diabetes (need regular insulin), Chronic renal disease, COPD, Cancer (need chemotherapy) etc due to the submerging of main hospitals and markets in the valley resulting in acute shortage of medical supplies. Though medicinal supplies in the form of aid were sent from outside the state, which, however, due to the inaccessible roads could not find its way to needy population and remained localised to some evacuation

campus.⁽⁷⁾

Impact on Patient Load

As there were incessant rains between 4th to 6th Sept, emergency registration as well as admissions were less during this period however it started rising from 7th Sept onwards as is shown in Fig 1. Emergency registration during the month of September was about 46% more than average for the year while as during October it was about 39% more than the average as is shown in Fig 2. Emergency admission was 34% more than the average during September 2014 while as it was 58% more than the average during October 2014 as is shown in Fig 2. Emergency registrations and admissions were not due to drowning or trauma but due to acute exacerbation of chronic diseases which had got neglected because of non availability and lack of access to health care facilities. This increase was because hospitals like SMHS, LD hospital, G.B Panth got submerged on 7th September and had to be evacuated and most of the Hi-tech machinery in these hospitals got damaged which left these hospitals non functional for about two months. OPD attendance at SKIMS however did not show any rise as people would seek consultation at various medical camps being organized by various NGO's throughout Kashmir valley though routine admission at SKIMS showed a rise during months of Oct and Nov 2014 (Fig 3). Rise in admissions was again due to neglect of chronic diseases and non availability of specialist and super specialist facilities at medical camps.

As SKIMS medical college and Bone and Joint hospital got submerged on 4th September only, there was no orthopaedic facility available in Kashmir. Forty three (43) patients were shifted from SKIMS medical college Bemina to SKIMS Soura on 4th Sept out of which most of the patients needed orthopaedic care and some needed obstetric care. Obstetric cases were adjusted in the 40 bedded obstetric wing at SKIMS while for orthopaedic patients a new 30 bedded ward was created out of a newly constructed area which was yet to be commissioned. The area was provided emergent electric and medical gas supplies. Staff for the area was arranged from SKIMS medical college.

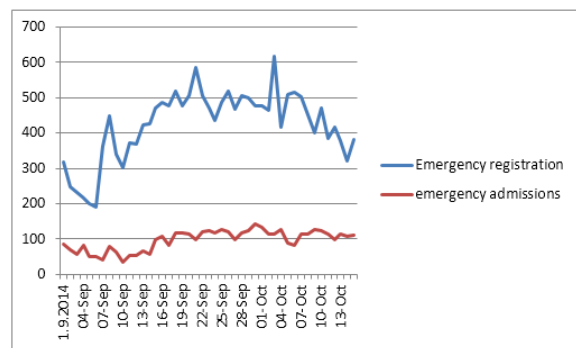


Figure 1 : Emergency registration and admission at SKIMS per day during floods.

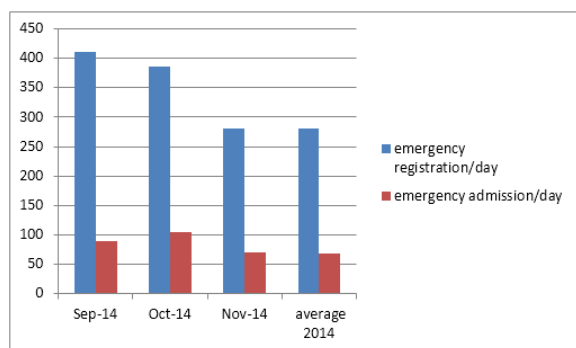


Figure 2 : Emergency registration and admission per day at SKIMS for months of Sept, Oct and Nov 2014.

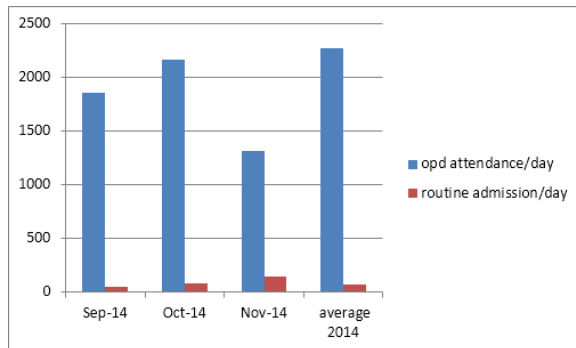


Fig 3 : OPD patient attendance and admissions per day at SKIMS for Sept, Oct and Nov 2014.

Responses

Crisis management by SKIMS -----> The management of SKIMS took immediate steps to overcome the challenges of shortage of manpower, supplies and infrastructure.

Capacity Building in terms of Infrastructure

In order to overcome the shortage of beds additional patient holding facilities were created in SKIMS. There were some major problems and challenges which if would not have been addressed the situation would have been worse. The challenges like a) capacity building in the form of new beds to accommodate the increasing admission rates especially in obstetric, neonatal and orthopedic care b) Extra space to be created for extra beds 3) Availability of more ventilators as admissions of ill neonates and other pediatric patients were increasing c) Extra staff to cater the extra load d) Adequate supply of medicine and other necessary supplies e) Availability of oxygen cylinders f) supply of diesel g) stock position of food items in canteen h) rehabilitation of affected staff members, discharged patients who were homeless and the students shifted from flood ravaged SKIMS medical college Bemina to SKIMS soura.

For patients of medical and surgical specialties an additional inpatient area was opened in an area under renovation. For obstetric care ground floor of recently constructed patient Sarai (inn) which was yet to be commissioned was converted into a hospital and added to the already existing forty bed complement. As influx of severely ill neonates and paediatric patients was again a challenge, more ventilators were provided to the neonatal ICU and an additional ten bedded neonatal ICU was created in Daycare ward where oxygen supply was augmented. Daycare ward was temporarily shifted to first storey of newly constructed patient sarai (inn). Overall SKIMS created about 160 additional beds within SKIMS premises and also in the newly constructed patient sarai. Above mentioned ventilators had been procured for new intensive care unit under construction. Fig 4 shows the increase in the number of surgeries and deliveries which were conducted at SKIMS during Sept and Oct 2014. Fig 5 shows increase in paediatric and neonatal admissions at SKIMS. There was appreciable increase in the number of investigations performed at SKIMS post floods (Fig 6) as most of the equipments in all other govt hospitals as well as private sector were damaged due to floods. SKIMS also witnessed higher admission rates especially for obstetric care during this period (Fig. 7 & 8)

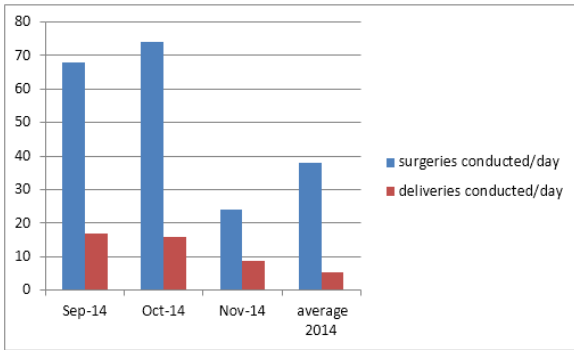


Fig 4: Surgeries and Deliveries conducted per day at SKIMS for Sept , Oct and Nov 2014 .

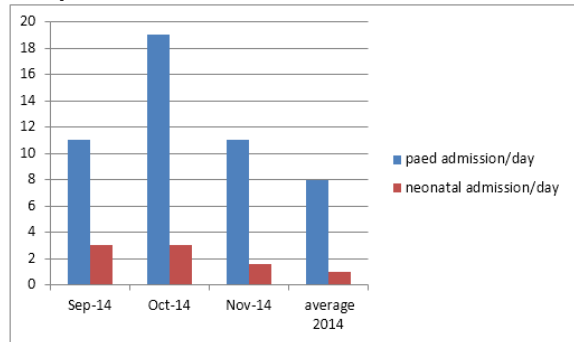


Fig 5: Pediatric and Neonatal admissions per day at SKIMS post flood.

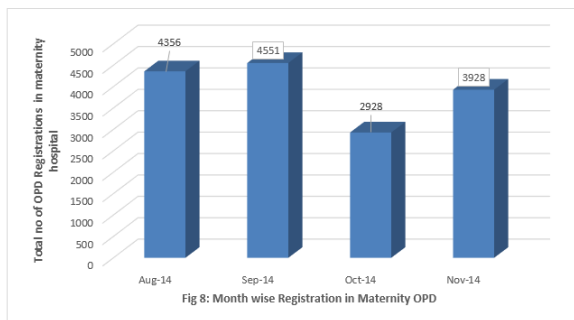


Fig 8: Month wise Registration in Maternity OPD

Capacity Building in terms of Discharged Patients

Although new patients were somehow managing reaching SKIMS for medical care, for discharged patients it was a difficulty to reach home as most of the roads were submerged. To overcome this problem, with the help of local community, Govt higher secondary school for girls Soura was converted into a hospital where besides 105 postoperative patients being managed w.e.f 6th Sept to 16th Sept 2014, patients who were discharged and could not go home were also provided accommodation and medical care.

Capacity Building in terms of manpower

As SKIMS had to open new areas for patient care to meet the challenge of influx, staffing was not a problem during first half of Sept as good percentage of staff members who were putting up within the campus performed extra duties. Nursing staff from SKIMS medical college was also utilised up to ending Sept 2014 till the college was partially functional. During October 2014 Msc nursing students of affiliated college were used to augment nursing staff. During November 2014 post basic nursing interns were used to augment nursing staff. By end of Nov process of recruiting additional nursing staff was started. Availability of nursing aides for these additional areas was again a problem which

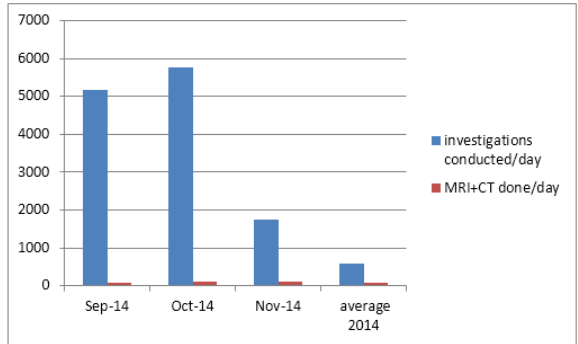


Fig 6 : Investigations carried out at SKIMS post flood .

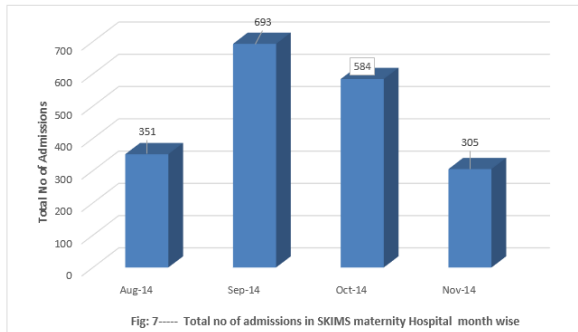


Fig: 7----- Total no of admissions in SKIMS maternity Hospital month wise

was taken care of by engaging skilled labourers from the waiting list of nursing aides. Availability of doctors was never a problem however orthopaedicians, ophthalmologists and ENT specialists were called from SKIMS medical college.

Capacity Building in terms of Supplies

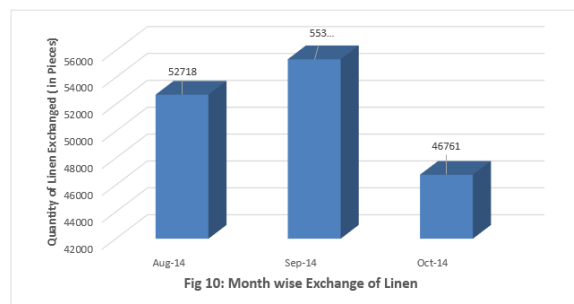
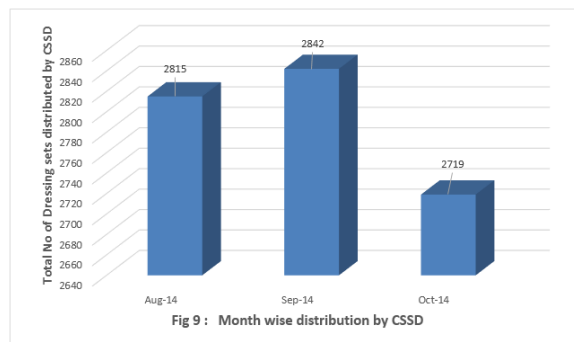
SKIMS had an adequate stocks of medical and surgical supplies and no shortages were faced inspite of breakage in supply chain except that stocks of Inj Vancomycin , Inj Linzolid and Inj Pantoprazole got depleted. These supplies were later received in the form of donation once air transport and road links were established. SKIMS also witnessed increased utilization of linen and Central sterilization items to the respective wards from stores to meet the extra need.(Fig 9 & 10) Although SKIMS has two oxygen concentrators of 750 L and 250 L capacity , oxygen supply had to be augmented by oxygen cylinders. Availability of these cylinders was again a issue but fortunately the supplier was able to restore supply quickly. SKIMS not only met its own requirement of medical and surgical supplies but also provided some supplies to other hospitals like Kashmir nursing home when 81 patients were shifted there from Bone & Joint Hospital on 5th September till their own supply lines were established. SKIMS keeps stocks of HSD (high Speed Diesel) which is used for central heating, generation of steam for central kitchen, CSSD and Laundry. SKIMS at time of floods had more than three lakh litres of HSD stored. About one lakh litres of HSD were kept available for running of generators of electricity and also it was used as fuel in SKIMS ambulances and other vehicles as stocks of diesel in Kashmir had exhausted. As a good will gesture SKIMS also provided about 200 litres of HSD to a private dialysis centre to keep the facility running and also provided fuel to ambulances of Kashmir nursing home which was struggling for want of fuel. To keep another nursing home in vicinity of SKIMS running, SKIMS administration supported the facility by sterilising their equipment in SKIMS CSSD as the facility was out of diesel.

Rehabilitation for Staff dislodged due to floods

SKIMS had also to provide accommodation to staff whose houses had got submerged. Many of the health care personnel who were supposed to be initial responders at the time of dis-

aster were victims themselves. In the initial post disaster period government was severely restricted in its attempt to assess and evaluate the status of damage.

One hundred three students of medicine and nursing were rescued by SKIMS from SKIMS medical college hostel Bemina on 4th Sept and SMHS nursing hostel on 9th Sept. These students were accommodated in SKIMS sarai, guest house and hostels. These students were also provided meals. The load of extra patients and students put extra burden on SKIMS canteen and food stocks started depleting quickly. Government was approached which quickly rushed some supplies of rice, sugar, milk and flour through divisional administration. Among these those students who hailed from Jammu were later on air lifted on 12th Sept.



Financial Assistance to Needy patients (Exemption made)

Another problem that patients faced was that they were out of money as most of ATM's and Banks were closed. Medical Supdt office made exemptions between 7th Sept to 17th Oct as follows: Hospital charges – Rs 30,582, Drug charges – Rs 69,736 and investigation charges- Rs 181,627.

Response from other Govt agencies

Hospitals which had got submerged started becoming partially functional by middle of October to end of Nov 2014 but not till central govt had to pump in around one hundred eighty crores for procurement of equipment for these hospitals. A three member team headed by Prof of Hospital Administration All India Institute of Medical Sciences was constituted by central govt for needs assessment. State government also provided funds to the tune of Rs 3.59 Crore to SKIMS for establishment of additional 200 bedded hospital at Sarai.

Once the flood waters receded there were apprehensions of epidemics but due to efforts of various government departments like health, PHE and municipality no such epidemics were reported. The severity of the floods and the inadequate rescue operations resulted in many casualties and dead bodies and carcasses of animals floated in the waters that covered a sizeable area of the valley. On the other hand poor hygiene and sanitation, lack of medical supplies, lack of drinking water and defunct hospitals had added to the possibility of epidemics spreading in the aftermath of the flood event⁽⁸⁾.

The areas of Srinagar inundated in the flood waters had been declared as hotspots for outbreak of communicable diseases by the health department and people were advised to be cautious while dealing with water and food items. Poisonous mud smeared in streets and pavements getting dry and creating dust with particles of chemicals, biological debris and harmful substances like cement, asbestos and other matter were again a hazard. The walls of the buildings affected by floods also developed fungus. After the worst ever flood hit the state, Post-Traumatic Stress Disorder (PTSD) was on the rise in Kashmir. Social cooperation and extra care by parents towards children was essential to overcome the trauma⁽⁹⁾

Discussion

Health infrastructure may be broadly defined as 'traditional life-line systems within a given community or geographical area'. Some systems contribute directly to the health of the community such as hospitals, clinics, emergency response units, and water treatment plants. Other systems such as shelter, power, fuel, and communication, are not directly labelled as "medical care systems," but still contribute to the public health and safety of the affected populace.⁽¹⁰⁾ In the worst case scenario, the very core of the health infrastructure, the hospital, could be disrupted. A review of many of the recent major natural disasters in United States revealed that damage or collapse of a hospital is quite rare. Yet, many of the disaster response protocols which were redesigned in the 1970s account for this possibility, even though loss of power or water is more common than structural damage. Hence, most hospitals in North America are equipped with at least one, if not two, backup systems to ensure that a moderate degree of functioning can occur in even the worst situation (although in severe disasters even the backup systems have been known to fail.)^(11,12) However, the situation is vastly different in developing countries.

In many underdeveloped emergency care systems, power failures or even structural damage are a real possibility in a serious disaster. In many cases, hospitals and clinics have received no additional disaster protection over the rest of the community, leaving the area at risk to a major catastrophe.⁽¹³⁾

A sign of a mature emergency care system is the specific development of disaster protocols and medical sub-specialties, such as trauma medicine, in order to deal with disaster injuries and challenges. Within the context of a developed emergency plan, large tertiary care hospitals take a central role in providing care for victims and even act as a central point of organization for the community as a whole.

With respect to floods in Kashmir the foremost threat in delivery of health care during floods was that all the leading hospitals were located in Srinagar city and most of them had got submerged. This stresses on the importance of regionalization of health care and strengthening health care systems with focus on health services and health facility networks^(14,15). The district hospitals need to be strengthened at least to level of secondary health care with adequate infrastructure in place which would offset dependency on centrally located hospitals. Administration of hospitals should periodically review with staff, the precautions that have to be taken to protect the equipment and during and post flood procedures to be followed. Hospitals should stock emergency medical equipment which may be required in flood management.⁽¹⁶⁾ As capacity building in the form of creating extra beds to manage increased influx of patients is a challenge, hospitals should have a laid down plan for creating extra beds. Hospital administration should have established work schedules to ensure that adequate staff is available for inpatient needs. Hospitals should organize in house emergency medical teams to ensure that adequate staff is available at all times to handle emergency casualties⁽¹⁶⁾. A study found that although

most nursing facilities reported staff shortages not interfering with patient care, some noted that the shortages forced available employees to work more than twenty four hours so that patient care could continue. As communication lines remain off during such disasters alternate forms of communication eg satellite phones need to be provided to key personnel to maintain communication to at least bare minimum. There are challenges concerning how to share information and coordinate overall activities among multiple health response teams.⁽¹⁷⁾ Further examination will be required to ensure better preparedness in response to future disasters.

Conclusion and Recommendations

Serious efforts are required to make disaster preparedness an important agenda of governance. The community based genuine research is the need of hour to get the real picture otherwise this depicts the tip of the iceberg.

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