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ENVIRONMENT AND CHOLERA IN KASHMIR DURING NINETEENTH CENTURY

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Sudden outbreaks of cholera in Kashmir during 1850-1892 have been described by many writers and physicians working in Kashmir during that period as indigenous due to insanitary conditions prevailing in Kashmir. It is the contention of this paper that although insanitary conditions were responsible for the spread of the disease, the cholera was brought to Kashmir as a result of population mobility between Kashmir and Punjab, and was the result of a pandemic wave. This is confirmed with the data and information available on the cholera outbreaks in other parts of the Indian-subcontinent, Europe and the United States. The paper also examines the cholera ecology in Kashmir during nineteenth century.

Key words: Cholera, Geo-ecology, Insanitary conditions, Kashmir, Meteorological factors, Missionary doctor, Pandemic, Punjab.

Introduction

Historical Medical Geography is a fascinating area of research which highlights the pattern of environmental conditions, people's adjustment with the environment and the occurrence of health problems as a result of man's interaction with the environment.

The outbreak of cholera and its diffusion in Kashmir in the 19th century was more or less considered a local epidemic with its origin in Kashmir and in the neighbouring Punjab. However, the examination of data and other source material on the outbreak and diffusion of cholera at the global scale in general and India in particular, reveal that cholera smouldering in an environmental hearth in the Gangetic delta of Bengal, erupted in four epidemic waves in the 19th century, which caused sudden and widespread

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mortality throughout the world. North America was stricken three times. In Europe the spectre of advancing death, fuelled by word of mouth reports, created an advance wave of panic, heightened by total public ignorance of cholera's aetiology. The eventual discovery that cholera is a water-borne infection was made during the cholera epidemic in London in 1854 by Dr. John Snow. According to J.M. Hunter, "With the widespread adoption of steam boats and the improvement of shipping lanes, global waves of the so-called Indian cholera spread even more quickly. The North American pandemics of 1832, 1848, and 1866 variously entered the seaports of Quebec, New York, and New Orleans and spread along river valleys and waterways. The disease passed through Buffalo, the Great lakes, Detroit River, Chicago and principally along the Mississippi River cholera was even carried west in the California gold rush . Later, the geographical pattern of spread of the disease in North America began to change as towns and railroads were constructed"(Hunter, 1888). A study carried out by G.F. Pyle showed that the 1866 epidemic was strongly influenced by the urban hierarchy, and was also related to distance from the eastern seaboard. Thus a regular, geographically predictable relationship was observable in the spread of the disease (Pyle, 1979).

The above discussion throws light on two important aspects:

1. To study the cholera ecology in Kashmir;
2. To test the hypothesis that cholera was not indigenous to Kashmir and was part of the process of cholera outbreak and diffusion globally ; since cholera occurred in Kashmir, and northern Indian sub-continent, Europe including the United Kingdom and the USA more or less at the same time.

Geo-ecology of Cholera in Kashmir

Physical Factor

The valley of Kashmir with its clayey loamy soils, nestles in the young folded mountain ranges of the Himalayas. The water in the Kashmir valley is an extraordinary paradox. Considering the total run-off, area of water-bodies and length of water courses, the valley has no match in the Himalayas . In fact its water features are the principal components in its scenic beauty .The geomorphic character of the valley is however, such that

the distribution of water resources is extremely uneven - a situation which renders vast stretches of land totally or partially out of use either due to excess of water or its deficiency. Water is most plentiful in the low lying parts of the valley, which remain literally deluged, while the adjoining *Karewa* unplands suffer from aridity imposed by its chronic deficiency. The consequence is that the valley presents the anomalous case of scarcity in the midst of plenty. The rivers carry large volumes of water which they cannot possibly contain as their channels get increasingly choked with silt, making floods a recurrent phenomenon with disastrous consequences on agriculture and on health simultaneously. It was this phenomenon of water scarcity in the midst of plenty as a result of particular geomorphological pattern that used to cause famine in the valley (Raza et al,1978). When famine is combined with cholera as was the case during 1877-79 it caused havoc among the people of Kashmir. Another aspect of geomorphic characteristics of the valley is the pattern of soil distribution. Writing in early 1890s, Walter Lawrence who was then Settlement Commissioner noted, "it is a curious fact, which I noticed in my tours, that villages on the *Karewa* plateaus seemed free from cholera,, and that the disease was most rampant in the alluvial parts of the valley" (Lawrence,1895). An examination of geo-ecology of cholera reveals among other factors that, apart from man(as both pathogens and geogens), there are environmental factors which facilitate the survival and spread of cholera. Such geographical factors include : annual temperatures of around 37° C and prolonged dry spells. Moisture is another important factor which favours the outbreaks of cholera. Cholera vibrios thrive best in warm alkaline media(with pH value between 9 and 9.6) while acidic media inhibit their growth and survival. The *Karewa* soils*, however, are normal with a pH value of around 7.5 and therefore not acidic. However, the *Karewa* soils are devoid of vegetal cover and are deficient in organic matter. The moisture-retaining capacity of the soil is poor as the upper layer has a high sand content (Raza et al, 1978). The characteristics of soils may explain the statement of Walter Lawrence regarding the absence of cholera in the villages on the *Karewa* soils of Kashmir valley**.

* On the border of the plain valley of alluvium occur extensive elevated plateaus of alluvial or lacusterine material which occupy a great portion of the valley.

**Lawrence's stress on the alluvial plains as a source of cholera may have been influenced by the 'sub-soil water' theory of the German Max von Pattenkofer, which was upheld by the British in India against Koch's bacilliary / water-borne (I.M.S. Officers ridicule Koch's findings, *Indian Medical Gazette*, 19, 1884, p.14).

Poor Socio-Economic and Insanitary Conditions

A Report dated 10the December, 1861 from the Deputy Commissioner on special Duty at Kashmir, to Secretary to Government of Punjab, is testmony of the poor economic conditions of the people in Kashmir. The report states, "The people in Cashmir are wretchedly poor, and in any other country their state would be almost one of starvation and famines…."(Report,1861). Under such socio-economic circumstances, people were not able to maintain a hygienic environment. Dr. William Elmslie, who arrived in Srinagar as a missionary doctor in 1865, described in his letters the unhygienic practices of the people which resulted in the widespread incidence of skin diseases. He writes, "But there are other things in Kashmir which most terribly detract from its pleasure as a place of residence. The dirt is beyond description. Who can tell what Kashmir smells are? Not the odour of roses, such as one has expected to fill the air; but oh! such, that the dirtiest of London courts is sweeter than the cleanest of Kashmir villages. The clothes, too, of the people are filthy; not that the filth shows much, for all their garments are of grey wool, which is a most perfect concealer of dirt; but not a few of their diseases are the result of their uncleanliness, and how often I have almost shrunk away from them, as, in my dispensary, while I have been examining a patient. I have seen the lice crawling on his clothes and his fleas skipping over to me. Of course, if you can avoid all intercourse with the natives, then dirt is not much a continual source of annoyance, but to us it was a daily trouble" (Elmslie, 1875). Similar views regarding insanitary conditions, in Srinagar were expressed by Irene Petrie who was very perturbed when she wrote, "Srinagar, with its water-ways, palaces, bridges and graceful fair skinned inhabitants, suggests Venice, though Venice much dilapidated. But from Venice there are no such views as one may see on a clear autumn day. It is perhaps the dirtiest city in the world, and most of the houses look as if they could not survive the next flood or earthquake" (Wilson,1900). Irene Petrie pleaded that people should be taught practically that cleanliness is next to godliness.

Most writers on Kashmir agreed to the fact that cholera outbreak was the result of "poor sanitary conditions." The centre and nursery of cholera in Kashmir is the foul and squalid capital Srinagar, but if it is once established there it soon spreads to the dirty towns and villages (Lawrence,1895, p. 219). Besides crowding was another serious problem. Nearly 1,18,960 people live

in 22448 houses with a density of 5 persons per house. The houses were "built irregularly and without any method, on narrow tortuous paths. Ventilation in the town is therefore very imperfect. Few houses have latrines, and small lanes and alleys are used as such….There is no drainage. Slush, filth and ordure are washed by storm water into the river and Nalla Mar which supply the city with drinking water. On account of absence of snow in winter and rains in spring, and river was dry and low and the bed of the Nalla Mar canal was converted into a string of cesspools. People were immersed in a polluted atmosphere caused by the products of putrefactive and fermentable water accumulated in houses and numerous narrow lanes, passes, nooks and crevices which intersect the town. This produced an epidemic constitution in the people fitted for the reception and fostering of cholera-germs" (Lawrence,1895,p.36).

Riverine Environment

The riverine environment,too,contributes to a greater extent towards cholera outbreak. The riverine environment was significant, in Kashmir in the 19th century. Most of the localities lined the Jhelum river for a length of about 5 kilometres, and the town extended less than a kilometre, with Habba Kadal locality as most densely populated area, with the river as the main source of drinking water . Drew compared the river Jehlum with the Thames, and wrote a vivid account of the layout of Srinagar. "It is (Jhelum) the chief artery of traffic; it is of much more importance as a thorough fare than any of the streets; indeed there are one or two streets, and those but short ones, that have any thing like a continuous traffic, while the river is always with boats" (Drew,1875). About the riverine environment Drew further noted, "A few canals traverse the interior of the town; one of them is wide, and is overlooked by some of the best of the houses. One is narrow,passing through some of the poorest parts, low dwellings crowd on it that, albeit they are well peopled, seem to be on the point of falling….A third canal leads from the upper part of the city to the gate of the lake, and shows along its winding course groves of plane-trees on the banks that make a beautiful combination with the smooth waters at their feet and the mountains that rise behind them" (Drew,1875, p. 185). Dr. William Elmslie, who arrived in Kashmir as a medical missionary, wrote about the outbreak of cholera in this riverine locality of Habba Kadal in 1867, "On 20th June, cholera has broken

out in the city. The worst was in Habba Kadal " (Elmslie,1875). Superstitious beliefs were a hindrance in controlling the spread of cholera. Writing about 1872 cholera outbreak, C.L.Tyndale Biscoe, who was an educational missionary, noted, "The flood was followed by an epidemic of cholera, in which it was difficult for the English medical missionaries to help as they wished, because the people, believing their sickness to be judgement from God, trusted chiefly to charms to be swallowed in water. These were pieces of paper, written by the priests and bought from them on which the name of ALLAH, or of some Mohammedan saints, or, in case of Hindus, of some god or goddess, was inscribed. The people continued drinking infected water all the same, and consequently cholera stalked through the land unchecked, claiming its thousands of victims" (Biscoe,1921).

Movement of polulation opening of jhelum route,and troop movement

With the commencement of Sikh rule in 1819, contact between Kashmir and Punjab began especially when Kashmir faced famine and there was acute shortage of food in the valley leading to a large scale migration to Punjab which contained several foci of cholera in north-western India. According to Lawrence, " a number of Kashmiris fled to Punjab as a result of famine in 1831.Sikh governor of Kashmir imported grains and eggs from Punjab and restored some measure of prosperity to the villagers who had lost their grain seed and fowls in the awful famine" (Lawrence,1895, p.200).However, the Sikh governor, considered sympathetic to Kashmiris, was murdered and the turmoil brought about by Bombas followed by raids by both Bombas and Kukas, Maharaja Gulab Singh, the Dogra* ruler of Jummu region took over the rule of Kashmir in 1846.This has further intensified the contacts between Kashmir with the cholera-prone region of Jammu, south of Kashmir. Travel between Srinagar and Jammu, especially the Maharaja's camp, brought cholera from Jammu . Dr A.Mitra, who wrote *Medical and Surgical Practices in Kashmir* (1890),opined, "Cholera is not endemic in Kashmir, but visits it often in virulent epidemic form. The last

* Dogra is the name given to the region around Jammu , and is said to be derived from a word meaning the 'two lakes' , as the original home of the Dogra people was cradled between the lakes of Siroensar and Mansar . From Jammu stretching east along the plains of the Punjab the region is Dogra; and all who live in that tract are known as Dogras.

epidemic as in 1880 during which nearly 10,000 persons died from cholera. The disease travelled with the Maharaja's camp from Jummoo to Srinagar, where the first case was observed on 6th April. Day by day the number of cases began to increase till on the 15th of May 250 persons were attacked in Srinagar alone" (Mitra,1889). Describing the horror of 1888 cholera outbreak, Mitra noted, "Its ravages extended to all parts of the valley. The scene of death and desolation during the summer of 1888 was one that will not soon pass away from living memory. The country was gay, magnificent arrangements were being made for a fitting reception of the Earl Dufferin. The Maharaja and suite arrived earlier than usual to loyally welcome the Viceroy. Suddenly the disease epidemic came, the Viceregal visit was abandoned and every body became panic-stricken. The Maharaja and suite and the Resident remained in Srinagar but no doubt in great trepidation" (Mitra,1889,p.11).

The intensity of cholera occurrence increased in Kashmir from around 1890 when the road between Punjab and Baramulla in Kashmir was thrown open. Lawrence wrote in grave fear, "Now that Srinagar is joined to India by a road, there is a two fold necessity for sanitary reform. For if cholera becomes endemic the Punjab and the great military cantonment of Rawalpindi will always be threatened, while on the other hand, the occurrence of an epidemic in India is sure to be followed by cholera in Kashmir, for cholera like trade, travels by roads. Before the road from Baramulla to the Punjab was opened cholera might occur in India while Kashmir was healthy, and whereas there were twelve epidemics of cholera in the Punjab between 1867 and 1890, there were only five outbreaks in Kashmir during the same period. Now it is almost certain that if cholera reaches the Punjab it will find its way along the crowded road and the narrow valley to Srinagar" (Lawrence,1895, p. 219).

It is interesting to note that a report on 1862 Punjab cholera prepared by J.B Scriven made similar observations. The report noted,"The route of the cholera was particularly well marked in the year 1861, in which it was regularly traced along the grand trunk road, from Delhi to Lahore. This year (1862), likewise it appears to have transmitted in two lines, one on the east and the other on the west of Punjab leaving the immediate country free" (Report,1861).

Dr. Elmslie's account

Dr. Elmslie narrated his experiences of cholera outbreak of 1867. He put forward his theory that the Maharaja's sepoys who went to Hardwar (a religious centre in northern India), brought cholera infection, "just as the hostility and opposition of the local government of Kashmir had reached a climax cholera broke out amongst his Highness's troops. It appears that some sepoys who had got leave to go and wash in the Ganges at Hardwar, had returned to their regiment at Srinagar, and brought the seeds of cholera with them. At any rate, those sepoys had scarcely arrived, when that awful pestilence broke out and began to carry off many. Everything was done to prevent the spread of the disease, but it at last invaded the city: and the British Resident deemed it necessary for the safety of the European visitors, to institute a *Cordon Sanitaire* round the European quarters. As my dispensary is situated there, I was compelled to put a stop to my work for a time…. The poor people of the city are sadly neglected, even by those who ought to take some care of them" (Elmslie,1875, pp.195-96).

As part of pandemic

Having studied the geoecology of cholera in Kashmir in the nineteenth century, it is worthwhile to throw light on the pandemics of cholera. F.G. Clemow in his book: *The Geography of Disease*(1903), opined that "the pandemics of cholera have always started from India" (Clemow,1903). Cholera, smouldering in an environmental heart in the lower Ganges valley, erupted in four epidemic waves in the nineteenth century, which caused sudden and widespread mortality throughout the world. North America was stricken three times. In Europe the spectre of advancing death,fuelled by word of mouth reports,created an advance wave of panic, heightened by total public ignorance of cholera' aetiology (Hunter,1988, p.117).

Diffusion of cholera from Bengal to Kashmir

F.N.Macnamara, whose book on *Climate and Medical Topography*, was published in 1880, provided the most scientific account on cholera diffusion in northern India (Macnamara,1880). Based on the analysis of data obtained from the book by Macnamara, the study reveals that cholera outbreaks occur in Bengal during February and March, move through northern India to Punjab and North-West Provinces, where its outbreaks are generally reported

in the months of August and September. Because of Kashmir's connection with Punjab, cholera moved to the valley and occur normally during winter months, November-January as mentioned earlier. The analysis of data for the period 1865-76 for Bengal, and 1870-76 for Punjab and North West Provinces reveals the following pattern of cholera outbreak in northern part of Indian sub-continent (Table 1):

Table 1. Cholera out-break pattern in Bengal, Punjab and North West Provinces (19th Century)

Province	Total cases (Average Annual)	Outbreak Occurred
Bengal (1865-76)	4657	February-March
Punjab(1870-76)	3019	August-September
N.W.Provinces (1870-76)	21960	August-September
Kashmir(1870-76)	Several thousands	December-January
(1888)	10,000	May-August
(1892)	18,000	May-August

It is evident from the Table 1 that the intensity of cholera generally increased as it moved westwards fron Bengal to N.W. Provinces. In Kashmir, cholera outbreaks were reported both in summer as well as winter. Cholera outbreak in Bengal in February or a little later during slight spring rains, moved to northern India and became epidemic till monsoon winds bring humidity, if not actual rainfalls (Macnamara,1880, p. 112).

It is interesting to note that cholera broke out in Kashmir during both a snow -free winter as well as a winter period which experienced heavy snowfall. In the *Gazetteer of Kashmir and Ladak*, Bates stated that "in 1857 cholera struck to the valley, strange to say, throughout the winter, when the snow was up to a man's neck" (Bates,1890). Contrary to this Lawrence wrote in 1895 that "on account of absence of snow in winter and rains in spring, the river was dry and low and the bed of the Nala Mar Canal was converted into a string of cesspools….This produced an epidemic constitution in the people fitted for the reception and fostering of cholera-germs" (Lawrence,1895,p.36). Thus it may be concluded that the outbreak of cholera in Kashmir was result of the pandemic wave and not the local environmental conditions, as cholera broke out both during snow free and heavy snow periods.

Cholera ecology model

Table 2 provides an insight of the ecological conditions which favour cholera outbreaks in Kashmir . It reveals that not only the physical factors but socio-economic and cultural factors especially mobility of population between Kashmir and cholera foci region of Punjab play a significant role in the outbreak and the diffusion of cholera.

Table 2. Cholera ecology model in Kashmir (1850-1900 AD)

(a) Physical Factors→	Rains + Estuarine Environment + Prolonged Dry Spells + Sluggishly Flowing Water + Alkaline soils
(b) Socio-Economic and Cultural Factors →	Unhygienic Living Conditions + Contaminated Drinking Water + Defecation in the Lanes + Growing contact with Punjab (migration) at the Commecement of Sikh rule followed by Dogra rule + Famine + Incoming of Troops from Cholera Foci Areas

Table 3 depicts the pattern of cholera diffusion model based on the movement of cholera from Bengal to Punjab and North-West Provinces. From Punjab, one wave of cholera diffusion moved to the valley of Kashmir,

Table 3. Diffusion model of cholera in Kashmir (during 19th century)

Calcutta (Ganga Delta)	→	Delhi	→	Jhelum
Jullundhar	→	Jhelum	→	Peshawar
Lahore	→	Srinagar		
	←	Srinagar		
Lahore	→	Ambala		
Ambala	→	Jumbo	→	Srinagar

mainly via the Jhelum route and the other wave of cholera reached Peshawar (Fig. 1). Besides, diffusion of cholera into Kashmir, also took place via the Central Asian route, possibly via Kabul. It is pertinent to mention that there were intense trade links between Kashmir and Afghanistan; a number of Afghanis were in the service of the Maharaja of Kashmir (Kabul,1882,1885).

Table 4 also reveals that cholera outbreaks in Kashmir were not isolated events but part of the pandemic wave spread throughout the world

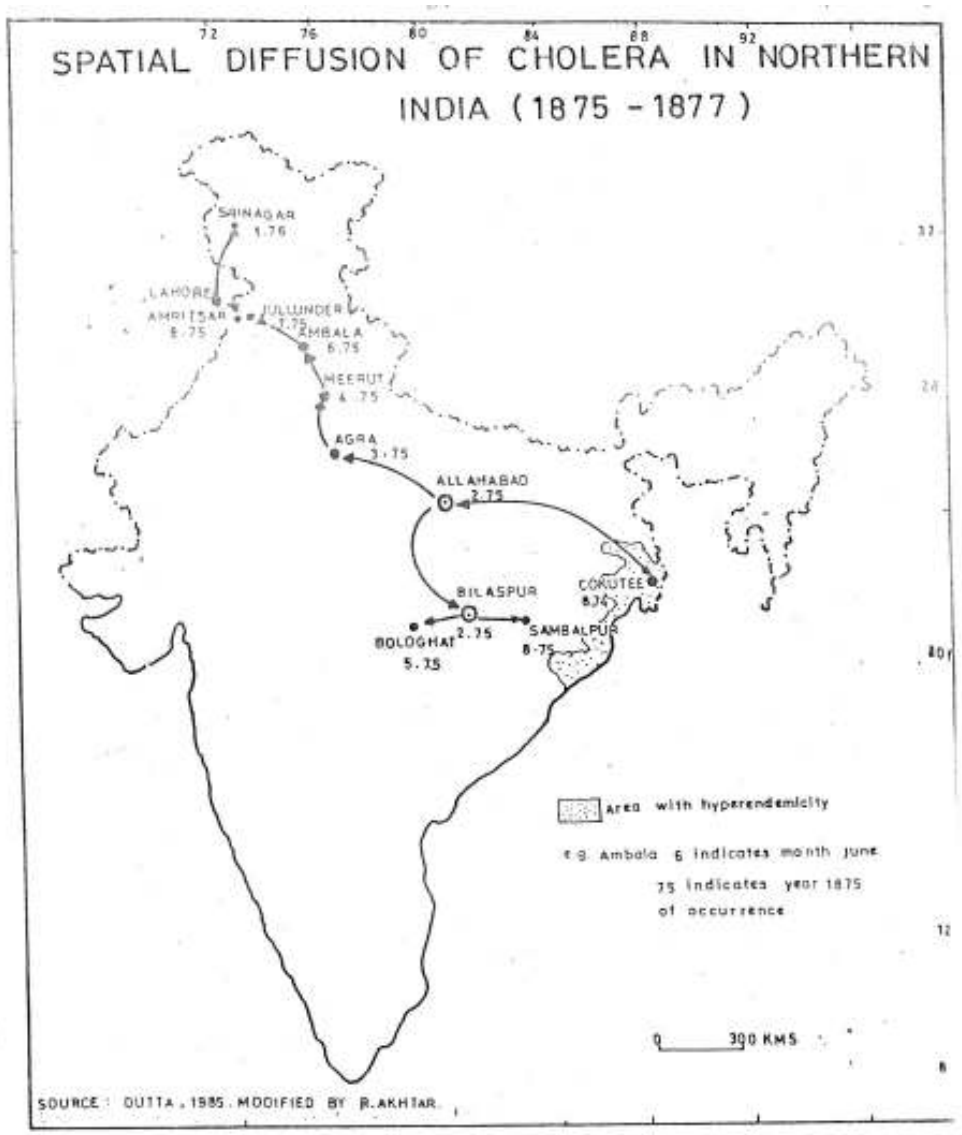

Fig. 1.

in general and the Indian sub-continent in particular.For example cholera occurred in Kashmir in 1845, and three years later it broke out in the USA and continued until 1850. Outbreak of cholera was reported in London in 1854, in Kashmir 1857-58; in Murree hill station in Pakistan in 1858, and in Nepal during 1857-58:

Table 4. Outbreak of Cholera during 1845-67*

Kashmir	Murree	Punjab	N.W. Provinces
1845 1857-58 1867	1858	1861	1862
Northern India	Central India		Rajasthan/Rajpootana
1867	1864, 1866 1869		1856 1866 1869
UK	USA		Nepal
1854, 1866-67	1848-50 1866		1857-58

* Based on the table produced by Bellew,1867 and 1879 were years of severe outbreak of cholera in Kashmir and in the Indian sub-continent.Similarly 1874 and 1877 were cholera free years in both these regions (Bellow,1885).

Rodenwaldt and Jusatz have published a World Atlas of Epidemic Diseases, in three volumes during 1952-61, which includes a map of worldwide diffusion of cholera (Fig.2) during the period 1863-68. The diffusion pattern reveals that cholera originated from Bengal and had diffusion through central India into Africa during 1863 and 1864. This could be linked with the migration of Indian labour force to British colonies in Africa in the nineteenth century. From Africa it reached the Middle East in 1865 and towards Central Asian countries where cholera outbreak continued to occur upto 1872. In view of the intense contacts between Central Asian countries and Kashmir, cholera arrived in Kashmir in 1867. According to G.F. Pyle (1979), the disease also "diffused southward through the Malay Peninsula and into the East Indies by 1865 . Another track was into China. During the period 1865 to 1867 the cholera spread into Europe and Russia, as well as down the west Africa coast. By 1866, the pandemic also had reached the New World (Fig.3). While entry into South America is not well known, Rodenwaldt's reconstruction suggests that the disease spread up the Rio La Plata and into the interior of the southern part of South America. Cholera spread rapidly to the Antiles in 1865 and reached Canada and the United States by 1866". Thus it is evident that cholera outbreak of 1867 in Kashmir was a part of a pandemic wave.

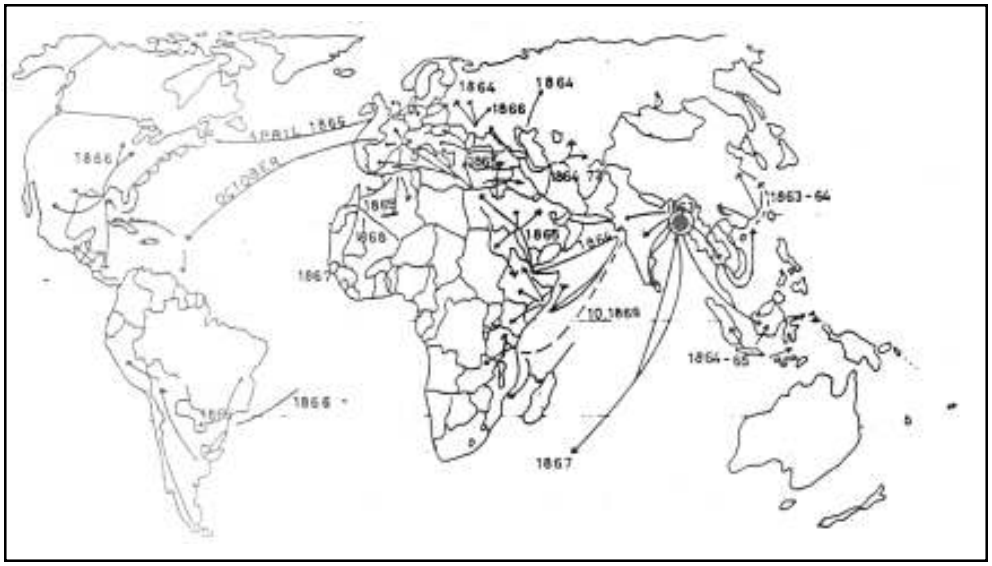

Fig. 2. Worldwide diffusion of cholera 1863-68

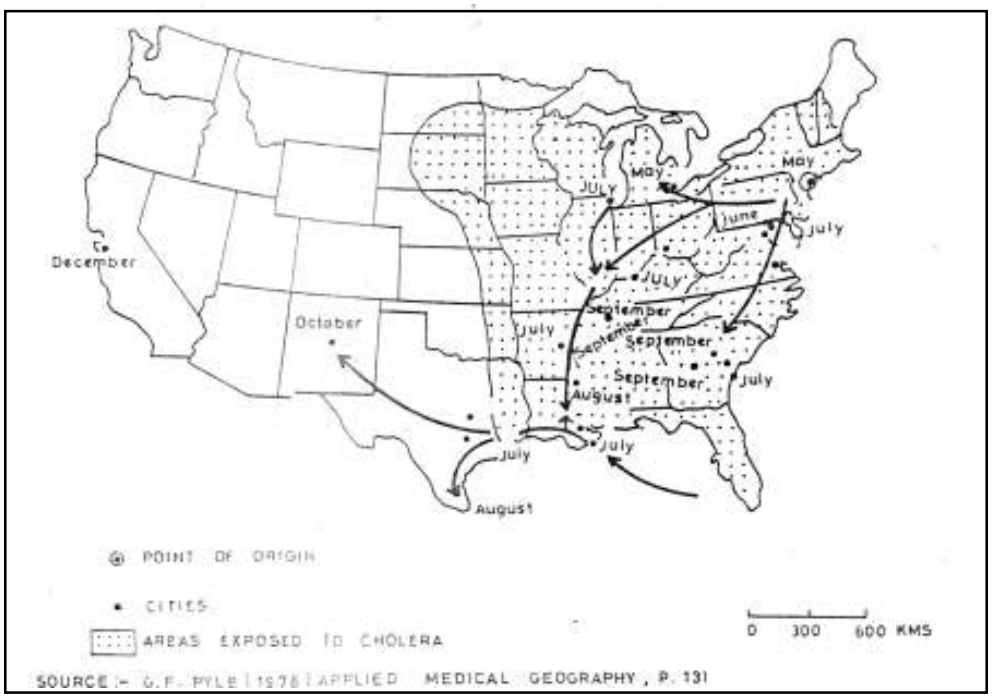

Fig. 3. Diffusion of Cholera in the US 1866

Insanitary conditions

As regards the second hypothesis on insanitary conditions related to cholera outbreak, the overview of the literature on insanitary conditions in some European cities suggests that Kashmir was not exceptional, and such conditions prevail in several cities of Europe where towns have a reputation for being more unsanitary than rural areas. (Jeffery, 1988). Following two examples are relevant:

Around the middle of 19th century,

> "Glasgow was possibly the filthiest and unhealthiest of all the towns of Britain at this period…Immigration into the city had occurred on a scale without precedent and accommodation provided to meet it was hopelessly inadequate…. Nor was there an effective system of refuse removal" (Howe,1972).

About the city of Exeter in England, Dr. Shapter writes:

> "The adequate water supply combined with deficiency of drainage, is so self sufficient evidence, …. dwellings occupied by from five to fifteen families hudled together in dirty rooms with every offensive accompaniment; slaughter houses in the Butcher Row: with their put rid heaps of offal; of pigs in large numbers kept throughout the city…..poultry kept in confined cellars and outhouses, of dung heaps everywhere…." (Howe,1972, pp. 181-82).

The above quotations are comparable to the account of insanitary conditions in Kashmir as described by Irene Petrie and Walter Lawrence. Thus, insanitary conditions prevailing during the latter half of 19th Century were not exceptional in the context of Kashmir only, and there was hardly any sanitary improvement in Kashmir until 1892, when the severest outbreak of cholera occurred. The question arises as how to explain the outbreak of cholera in certain years. Mobility of population between Kashmir and Punjab and later with Jammu region could be the main source of infection and subsequent diffusion of cholera in Kashmir . It is also evident from the above discussion that cholera outbreak occurred simultaneously in several other towns and cities of Indian subcontinent as well as in other parts of the world including Europe and the USA.

Meteorological evidences and outbreak of cholera

Regarding the sudden outbreak of cholera in Kashmir, the opinion of J.Fayrer, a medical climatologist needs consideration. Fayrer who wrote books

on, *The Natural History and Epidemiology* (1888), and *Preservation of Health in India* (1894) was a prolific writer on medical climatology, had worked in India with the Indian Medical Service. Fayrer preferred atmospheric theory against water borne theory (then generally accepted by the British Medical Professionals a result of Dr. John Snow's work on Cholera in London in 1854). Fayrer noted that the suddenness and virulence of certain outbreaks of cholera are remarkable, and seem to point to some factor apart from contagion or local insanitary conditions. Rather, the evidence seemed to point to changing meteorological conditions:

> "At Kurrachee, in 1866….there was a sudden change in the atmosphere, the wind veered from south-west to north-east, and a thick lurid cloud darkened the air. Later in the evening cholera appeared in thirteen corps of the troops stationed there."(Fayrer,1888).

Karachi was also affected by sudden cholera outbreak two decades earlier. According to Sanitary Report of 1869. Cholera broke out in Karachi in 1846, and resulted in the death of 438 European soldiers out of 3345, and 199 Native soldiers out of 3045. The Sanitary Report states,

> "It was in the evening of 14th June that Karrachi was struck. The epidemic occurred before Dr. Snow's theory was announced, and it is interesting to observe that among the many hypotheses that were advanced to explain its suddenness, its virulence, and its very partial distribution, no mention whatever is made of the state of water supply .No one appears to entertained the smallest suspicion that the virus could have been disseminated through that medium" (Report on Sanitary Administration, 1876).

It would not be out of context to mention that it seems Dr.John Snow's theory on cholera was quite well known by medical personnel working in Jammu, Kashmir and Ladakh regions during later half of nineteenth century.Caley,a British surgeon who worked at Leh dispensary of Jammu & Kashmir published a paper in 1868 in *Indian Medical Gazattee,* referred cholera as poison of the disease.It must be mentioned here that in 1849 John Snow published a small pamphelet entitled, "On the mode of communication of cholera", in which he proposed that "cholera poison" reproduced in the human body and was spread through the contamination of food and water.Thus it it seems Caley was aware of the John Snow's work.

In the absence of detailed meteorological data, it is not possible to test the theory of meteorological explanation in the outbreak of cholera in

Kashmir . However, two statements, cited earlier that of Dr. Elmslie and Dr.Mitra do give some idea of sudden atmospheric change in relation to cholera outbreak. On an earlier occasion in 1862, Maharaja was held up in Jammu and could not move to Srinagar as a result of cholera outbreak. " In May-June cholera raged with such virulence in Jummoo, that the Maharaja delayed his departure for Cashmere till it abated…. at the end of July- the season of periodical rains" (Elmslie,1875, pp. 195-96).

During the 1867 outbreak, it seems rains were deficient until August 2, when Dr.Elmslie wrote that the city of Srinagar experienced a great storm of wind and rain for about an hour and prayed, "May good result from this." It rained heavily in the coming few weeks, and according to Dr. Elmslie, the cholera seems to lie on the wane(Elmslie, 1875, pp. 195-96).

However, the analysis of temperature and rainfall data for 1892, the year of the severest outbreak of cholera, reveals that spring rains failed in that year, but the summer rains were in excess, as a result of very high mean maximum temperature during the months of July, August and September 1892.According to annual Administration Report, drier weather than usual during April to May followed by torrential rain, could be the reason for the severe outbreak of cholera in 1892.

Impact of sanitary measures

After the 1892 cholera outbreak in Kashmir, efforts were made towards improvement in sanitary conditions. These have brought desired results. According to the Annual Administration Report of 1895-96, the sanitation conditions in the a city of Srinagar have improved considerably. "Roads and drains have been made, a supply of pure water has been started and conservancy is systematically and methodically done. Dr. A. Mitra who was also Administrator,Srinagar Municipality during the 1892 cholera outbreak, says, "These measures of public sanitation are having their influence on the habits of the people, and thus the cause of both public and private hygiene is improving with rapid strides.The opprobrium now resting on Srinagar, as a filthy city, and on its inhabitants, as a filthy people, will,I confidently hope, be a thing of the past at no distant date. Never, perhaps in the history of sanitation so quickly and so effectively have sanitary improvements been done as in Srinagar, in spite of financial and other local difficulties" (AAR,1892).

Describing the horror of 1892 cholera outbreak, Rev. Tyndale Biscoe who arrived in Kashmir in 1890 and started a missionary school, commended the assistance of school boys who rendered valuable services. He writes, "I was very much gratified that at the commencement of the cholera about six boys came and offered their services to help look after the sick. Now the Kashmiris were in deadly terror of it, and one of these boys who offered to help died of it (such a dear fellow)" (Biscoe,1892). Dr. E.F.Neve who was missionary doctor in the valley discussed the religious-cultural aspect of people's behaviour at the time of the 1892 cholera outbreak. People and faith in the power of shrines. According to Neve, "And even the common people placed the most implicit trust in the protecting power of the shrines. In village after village, where the cholera did not come, the people ascribe their escape to the influence of the village Ziarat (shrines) and the offerings which they make. The love of shrines and relics is deeply imbued in the heart of superstitious man" (Neve,1892).

Politics of Health

Although a critical discussion on the politics of health during the nineteenth century Kashmir is not the objective of the paper, a side reference in this regard will not be out of context.Having discussed the scenario with Mark Harrison (Personal Communication,1999), I am firm in my opinion that there could be a political motives for portraying Srinagar as filthy,for example.It is a fact that public health was seen as part of the British 'civilising mission', and that it was intimately connected to Imperial ideology pertaining to maximum resource exploitation.Imperial policy of cholera control was not based on a humanistic perspective, but as a result of economic reasons.To prove this point,I quote Lawrence, "I have stated above that if the disease is once established in the congenial filth of Srinagar it soon spreads to the villages, causing heavy mortality among the revenue-paying cultivators of the state, and just as I urge that, even in the interests of the land revenue alone,it is politic to prevent famine, and utter disorganization and financial ruin which attend on famines, so do I urge that it is financially wise to clean Srinagar, and to remove the present danger of cholera" (Lawrence, 1895, p. 219). This is a clear evidence that the efforts made by the government to control/eradicate cholera was aimed at to minimize loss of land revenue, other than welfare perspective.

Paradoxically, severe outbreak of cholera occurred even in the Military Cantonment of Lahore, which is considered cleaner than civil areas.According to Bellew, "out of the force comprising 2452 men, women, and children, 880 were attacked with cholera, and 535 died in the space of little more than a month…..cholera hardly existed outside cantonments of the troops, and that, while our soldiers were dying by hundreds, the city close by, with its 90,000 people, remained almost entirely free from the disease" (Bellow,1885,p.1).

The above examples clearly reveal that political and economic motives were behind the formulation and adoption of sanitary policies.

Conclusion

It is evident from the discussion that though insanitary conditions prevailed in Kashmir throughout the last century, the outbreak of cholera was confined to certain periods of time. The duration of cholera prevalence also varied from one month in 1827 to 13 months during 1875-76. Mortality figures due to cholera also varied from couple of thousands in 1867 to 18000 in the 1892 outbreak. The study clearly shows that cholera was not indigenous to Kashmir, but was part of pandemic wave with a focus in the Bengal delta, sweeping across the Indian sub-Continent and diffusing to Central Asian countries, Europe, Africa and the United States. The Study also argued that cholera diffused to Kashmir both via Punjab i.e. Jhelum river route, as well as via Central Asian route including via Kabul. The study reveals that after 1892 cholera outbreak, strict sanitary measures and vaccination campaign started, resulting in the decline of a cholera incidence in Kashmir . Similar sanitary measures and vaccination campaigns were also launched in other parts of Indian sub-Continent leading to the decline of cholera cases. Finally the study does highlight the significance of meteorological conditions in the outbreak of cholera in 1892 i.e. the drier weather during April to May followed by heavy rain and high temperature during summer months could possibly be the cause of cholera outbreaks. There are also indications of the relationship between the designation of Srinagar as filthy city and introduction of cholera control measures to enable the fulfillment of Imperial policies of resource exploitation.

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References

C.E. Bates (1890) *A Gazetteer of Kahmir,* Reprinted in 1980 by Light & Life Publishers, New Delhi, p.463

H.W. Bellew (1885) *The History of Cholera in India From 1862 to 1881*, Trubner & Co. Ludgate Hill,London, p.502

C.E. Tyndale Biscoe (1892) Letter from Kashmir,*Extract from the Annual Letters*,October,Archives,University of Birmingham

C.E. Tyndale Biscoe (1921), *Thomas Russell Wade: A Pioneer in Kashmir*, Church Missionary Society, London, p. 7

F.G. Clemow (1903), *The Geography of Disease*, Cambridge Geographical Sereies, Cambridge, p.93

F. Drew (1875), *The Jummoo and Kashmir Territories: A Geographical Account*,London, p.181

W.J. Elmslie (1875), *Seedtime in Kashmir:A Memoir of William Jackson Elmslie*, London James Street, Edited by Mrs. Elmslie

J.C. Fayrer (1888),*The Natural History and Epidemiology of Cholera*, London, pp.52-53; Also see, J. C. Fayrer (1894), Preservation of Health in India, London

G.M. Howe (1972) *Man, Environment and Disease in Britain,* Penguine Books, London, pp.178-79

J.M. Hunter (1988), Geography and public health, In *Earth'88: Changing Geographic Perspective*., Proceedings of the Centennial Symposium,National Geographic Society, Washington, D.C., pp.117-118

J&K Government, *Annual Administration Report*,Govt. of Jammu & Kashmir,Jammu, 1892

R. Jeffery (1988), *The Politics of Health in India*, University of California Press, Berkeley, p.40

W.R. Lawrence (1895), *The Valley of Kashmir*, Henry Frowde, London, p.36

F.N. Macnamara (1880), *Climate and Medical Topography in Their Relation to the Disease Distribution of the Himalayan and Sub-Himalayan Districts of British India*, London, Longmans Green and Co

A.Mitra (1889), *Medical and Surgical Practices in Kashmir* (1889), Lahore, 1890, p.9

National Archives, Delhi, Kabul residents who are in the pay and employment of Cashmere, *Report, August, 1875*,pp.82- 86 (National Archives,Delhi). Also see:Arrival of certain Afghan refugees at Srinagar, August, 1882,1885, secret file (National Archives, Delhi).

E.F. Neve (1892) Letter from Kashmir, *Extracts from Annual Letters*, November 9, Archives University of Birmingham

Personal Communication (1999) with Mark Harrison,Director, Wellcome Unit for the History of Medicine, University of Oxford,Oxford

G.F. Pyle (1979), *Applied Medical Geography*, V.H.Winston Sons, Washington, D.C.,p.129

M. Raza, A. Ahmad and A. Mohammad (1978), *Valley of Kashmir*, Vikas, New Delhi, pp. 82-85 4. Raza et al, p.116

Report from Dy. Commissioner on Special Duty at Cashmere to Govt. of Punjab, dated 10th December, 1861

Report on the Sanitary Administration of the Punjab (1869), Government Press, Lahore, 1876, p.112

Report from Dy.Commissioner on Special Duty as Cashmere to Govt. of Punjab, dated 10th December, 1999

Ashley Carus Wilson (1900), *Missionary to Kashmir: Irene Petrie*, Reprinted by Swati Publication, Delhi, 1993, pp. 112-113.