

Role of Cultural and Social Barriers in Increased Burden of Hepatitis B in Pakistan: Literature Review

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Abstract

Hepatitis B is a deadly infectious disease, which is increasing now days in Pakistan. This disease is also rooted in the poverty and illiteracy. There are huge discrepancies in health conditions between rural and urban areas and among different socio-economic strata, which have also played role in increasing the burden of this deadly disease. Furthermore, multiple social and cultural barriers are prevailing in the country which might have played an important role in increased burden of this disease in the society. Thus, it is important to review the literature on the burden in Pakistan and to study those social and cultural barriers causing rise in the burden of Hepatitis B. Thus, the objective of this review was to synthesize the findings regarding the burden of Hepatitis B in Pakistan and to review the social and cultural barriers, which have resulted in increased burden of the Hepatitis B in Pakistan. This would help Policy makers and Government of Pakistan to take some appropriate actions against the most common barriers, playing an important role in increased burden of the disease.

Keywords: Hepatitis B; Social; Cultural; Barriers; Pakistan

Introduction

Developing world is in the midst of a profound health transition [1]. In many developing communities the persistent burden of infectious diseases is now coupled with the rising tide of non-communicable disease (NCD) [2]. This same problem exists in Pakistan, where first half is due to communicable diseases, reproductive health and malnutrition while the second half is due to non-communicable diseases including injuries and mental disorders [3].

Although health system of Pakistan is fragile in comparison to many other countries but Government has tried to provide the health services to the community through various programs [4]. But, inequalities and disparities in service provision still remains and health is not accessible to many people from lower socioeconomic strata [5]. Thus, poor people are more prone to develop many diseases including infectious diseases [6].

People of Pakistan get services both from formal and informal sectors [7]. Pakistan has a long history of traditional healers including Pirs, Hakeems and Traditional birth attendants. (TBAs) or 'dais'. In developing countries such as Pakistan, the informal healthcare sector not only includes traditional healers (Hakeems in local language), but also homoeopaths, spiritual and faith healers, bonesetters, traditional birth attendants (Dais in local language) and quacks. This sector accounts for more than 70% of consultations in the country [7]. These traditional healers provide health care to the people of Pakistan when the access to formal sectors is not adequate and cost of the services is high [7]. According to Pakistan Medical Association, these Pirs, Hakeems and TBAs are classified as Quacks who have no formal medical qualifications but portray themselves as formal health care

providers [7]. This low quality of health care along with limited access to clean water, sewage facilities and a poor public health infrastructure has resulted in high burden of infectious diseases, maternal and child mortality and needless suffering [8]. In addition to these problems, under nutrition is one of the important issues in country which has resulted from many factors including infectious diseases as well as rise in food prices throughout globe [9]. Pakistan has one of the highest population growth rates in Asia (1.9 % per year) with very little evidence of a fertility decline [10]. These problems are rooted in poverty and low levels of literacy, resulting in burden of diseases which further results in poverty [11]. This vicious cycle goes on and worsens the situation of Health of Pakistani nation [11]. Furthermore, high fertility, illiteracy and inadequate infrastructure, have been identified as the main barriers in improving health conditions of the people [12]. Pakistan has a high fertility rate and this rapid population growth will increase further strain on already exhausted, overstretched and underperforming health care system [13]. Efforts have been made over the years to improve health standards, but these efforts have been neutralized by the rapid growth of the population. In addition, gender bias and limited access to health services further compromise health of Pakistani population in 21st century [5].

Health and demographic characteristics in Pakistan are substantially worse than those of other countries in the region [14]. Maternal mortality rate is around 276 per 100,000, infant and under-five mortality rates in the past five years are 74 and 89 deaths per 1,000 live births, respectively [15].

There are huge discrepancies in health conditions between rural and urban areas and among different socio-economic strata too [16]. Infectious diseases like Viral Hepatitis, Malaria, Tuberculosis and wide variety of childhood diseases such as diarrhoea, measles and tetanus still continue to pose potential threat to the health of millions of people

in the country [17]. Most of these victims live below the poverty line due to high prevalence of these diseases in the low socioeconomic group [16]. This burden of diseases force population to seek medical care from informal sectors and the small clinics, which further expose them to other lethal viral diseases transmitted mainly during process of treatment like IV (intravenous) hydration in diarrhoea, IM (intramuscular) and IV (intravenous) injections in other diseases [16]. These diseases result in to impoverishment and catastrophic expenditures due to disabilities associated with these diseases [16].

Furthermore, diseases like swine flu, Crimean Congo haemorrhagic fever, *Naegleria fowleri* and other viral infections are emerging in the country [18]. Pakistan ranks fifth among highest TB burden countries across the world [19]. Moreover, malaria and dengue fever are prevalent and HIV is also on rise among general population due to bridging population and high risk groups which are increasing their interaction with general population [20]. Unlike other diseases, no vaccine is available for these emerging diseases and most of these diseases can only be controlled by adapting the preventive measures [20]. Unfortunately Pakistan is one of the two countries which have not eliminated polio from its globe [21]. Despite the availability of vaccines for Polio and Hepatitis B, these diseases are still endemic in Pakistan [21]. Pakistan has diverse socio culture prevailing in various geographic areas [22]. This difference in culture is also reflected through misconceptions about the vaccination. For example, people from tribal regions of Pakistan believe that vaccine will make the population infertile and this type of misconceptions create barriers in prevention of many preventable diseases like polio and Hepatitis B [23]. These strong norms and myths about many diseases and vaccines have created barriers for vaccination even among well off families [24]. Although, a lot of research has been done on the prevalence and risk factors of Hepatitis B but to the best of our knowledge, none of the studies have explored the socio cultural barriers which have resulted increased burden of the Hepatitis B in Pakistan. Thus, it is important to synthesize the findings regarding the burden of Hepatitis B in Pakistan and to review the social and cultural barriers which have resulted increased burden of the Hepatitis B in Pakistan. Hence the objective of this review was to explore and synthesize different sociocultural barriers which have resulted increased burden of the Hepatitis B in Pakistan.

Hepatitis B is a disease which is caused by virus and it causes inflammation of the liver [25]. Human beings are the only reservoir of this virus and it is highly fatal when not diagnosed earlier and not treated on time [25]. Chronic Hepatitis B can cause liver damage which can lead to many lethal outcomes like chronic hepatic insufficiency, cirrhosis, hepatocellular carcinoma and even death [26]. Main threat of this disease is due to its multiple modes of transmission [26]. Although the main route of transmission is through blood but it can even be transmitted through sexual contact and vertically from mother to child.

The main factors in transmitting the Hepatitis B through blood is the reuse of syringes, tattooing with unsterilized instruments, practice of shaving at barbers shops, exposure to unsterilized surgical and dental instruments in hospitals, nose/ear piercing, ritual circumcision, acupuncture and unscreened blood transfusion (Figure 1) [27,28]. The risk also increases among those who have multiple sexual partners [29]. It has been proved that Hepatitis B can also be transmitted by sharing nail cutters and sharp combs [28]. Lack of awareness about these transmitting agents can create many and behaviour with behaviours due to insufficient knowledge among population [28].

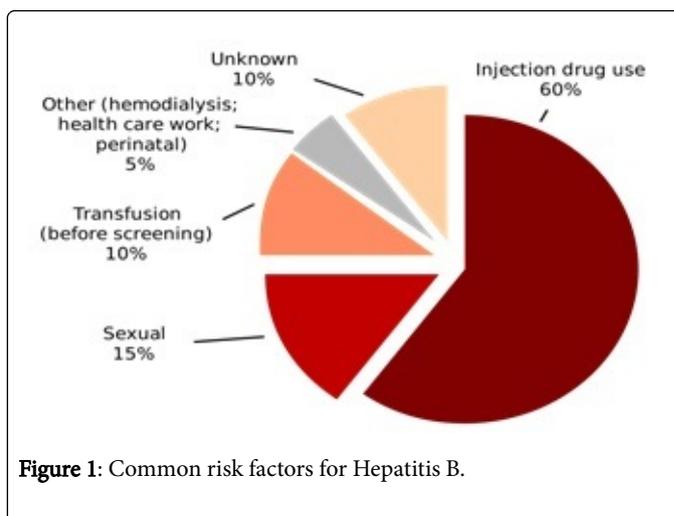


Figure 1: Common risk factors for Hepatitis B.

This disease manifests itself by loss of appetite, malaise, fatigue, nausea, vomiting, abdominal pain, dark urine and Jaundice as shown in Figure 2 [26]. Unfortunately, treatment of Hepatitis B (medicine like interferon and many antiviral therapies) is very long term and expensive, which can lead to severe catastrophic outcomes for the family as well for the society [26].

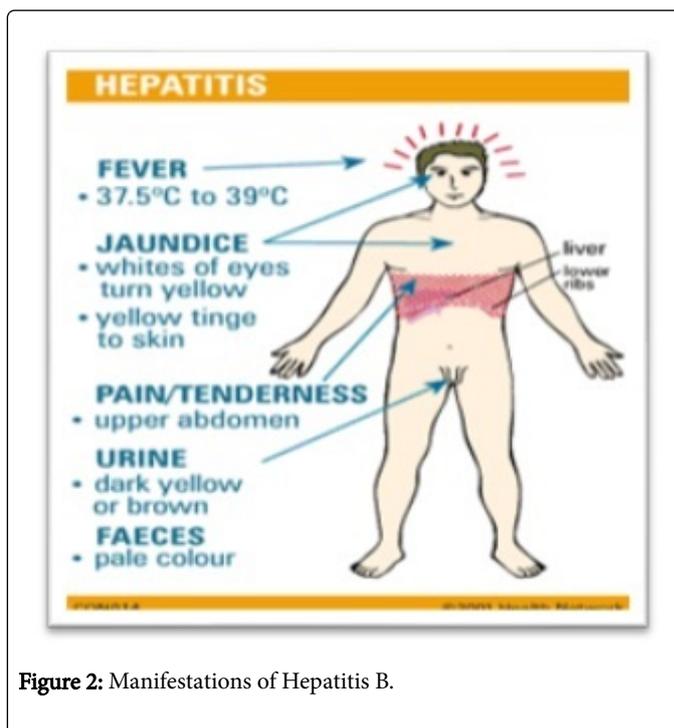


Figure 2: Manifestations of Hepatitis B.

Burden of Hepatitis B

Hepatitis B virus (HBV) infection is a serious global health problem (Figure 3), with 2 billion people infected worldwide, and 360 million suffering from chronic HBV infection and results in 500 000 to 1.2 million deaths per year caused by chronic hepatitis, cirrhosis, and hepatocellular carcinoma; the last accounts for 320 000 deaths per year [30]. Hepatitis B is one of the major health problems globally resulting in enormous burden on health care system and is major source of

patient's misery [31]. It is estimated that out of more than 2 billion people infected with Hepatitis B virus globally including 350 to 400 million infected carriers [32]. According to WHO Hepatitis B virus infection is directly related to more than 2 million deaths per year globally [8]. The Asia-Pacific region is among the world's worst affected areas with an estimated 5% to 20% of the population being positive for HBV surface antigen (HBsAg) [33]. According to WHO, 200 out of 350 million infected carriers live in Asia and India, China, Taiwan and South Korea represent highly endemic areas for viral hepatitis, with prevalence rates ranging from 4-19% for Hepatitis B (HBV) [33,34].

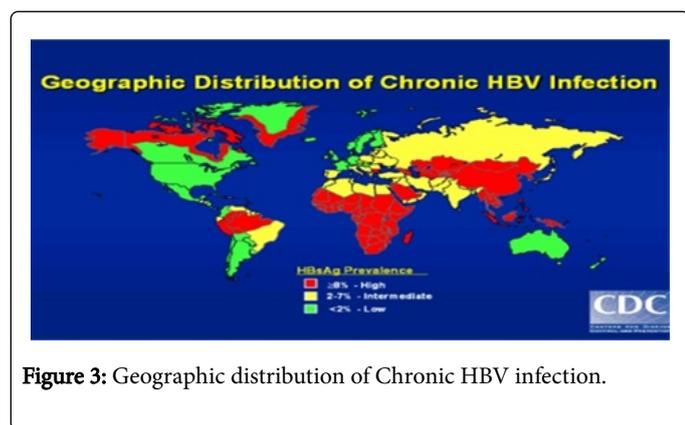


Figure 3: Geographic distribution of Chronic HBV infection.

Data about prevalence of Hepatitis B in general populations

Pakistan is endemic country for viral hepatitis mainly hepatitis A, B and C [35]. Hepatitis B is more dangerous due to its co-infection and

super-infection with Delta virus [26]. Case fatality rate with delta infection in Hepatitis B patients is estimated about 30.2% in Sindh and Punjab [36]. More than 15 Million Pakistanis have already been affected by Hepatitis B & C mainly and this burden is mainly attributed to re-use/suspect quality syringes [37]. Three small studies in Baluchistan showed a higher prevalence of HBsAg (9.3% weighted average, range 3.9-11.0%) compared to other provinces. Wide variations in different areas within each province were again noted [32].

In general, blood donors' studies can't be generalized on general population of country. This means that the expected prevalence of Hepatitis B would be high than has been observed in many other studies [38,39]. National prevalence of Hepatitis B is 2.4% and 4.9% for Hepatitis C. Around, 5-15% cases become persistent carriers for Hepatitis B [40,41]. Furthermore, various studies on prevalence of Hepatitis B in Pakistan have shown that 32% of patients with liver diseases were suffering with Hepatitis B and 80% of patients with liver cancer were positive for Hepatitis B [42]. Few studies have been published from Baluchistan, NWFP, and rural parts of Sindh. Three small studies in Baluchistan showed a higher prevalence of HBsAg (range 3.9-14.0%) compared to other provinces. Although, wide variations have been found in different areas within each province but no clear trends in prevalence rates were identified over time as shown in Table 1 [42]. Furthermore, the prevalence of Hepatitis B is more common among males as compared to females (8.13% and 6.7% respectively). These differences could be due to differences in exposures as majority of intra venous drug users are found to be males and they also use to go to barbers for hair cutting and shaving [36].

Place and study site	Period	Test used	Number	% HBs Ag+ positive (95% CI)	% Anti HCV positive (95% CI)
Shi fa International Hospital Islamabad	2001-2002	EIA	503		4.8 (4.72-4.88)
DMC and Sobhraj Maternity Home, Karachi	1999	ELISA	245	12 (3.12-3.40)	
Gangs Ran Hospital, Lahore	Oct 2006 Math 2007	ELISA	2439	2.2	7.3
Ziauddin Hospital, Karachi	1997-98	EIA	801	2.2 (2.16-2.24)	
PNS Shifa Karachi	1997	RPHA	474	3.1	6.4
PMRc, JPMC, Karachi	1979	RPHA	45	9	
JPMC Karachi	1989	RPHA	1000	4.0 (3.96-4.04)	
LRH Peshawar	2001	EIA	352		5.1 (4.9-5.2)
Services Hospital, Lahore.	2002	ELISA	100		7
Lady Aitcheson Hospital-Lahore	2001	EIA	300		6.00 (5.84-6.16)
Ganga Ram Hospital, Lahore	2005	ICT	1000	1.8	
NIH Islamabad	1992	RPHA	6225	4.00 (3.99-4.01)	..
Shi fa International Hospital, Islamabad	2001-02	ELISA	947		3.2

Jinnah Postgraduate Medical Centre, Karachi	2002	EIA	77		13.2
Shaikh Zayed Hospital, Ratom Yer Khan	2006	ELISA	450	12	18.2
Ghurki Trust Hopis, Lahore	2005	ELISA	1569		6.8
LUMHS, Hyderabad	2003	ELISA	103	12.6	16.5
Gangs Ran Hospital, Lahore		ICT	1000	1.8	
Kharadar General Hospital, Karachi	2002-06	ICT	25482	1.6	

Table 1. Studies showing the prevalence of Hepatitis B in different cities of Pakistan.

Factors leading to increased burden of Hepatitis B in Pakistan

In addition to the burden of communicable diseases, Pakistan is also facing burden of non-communicable diseases like Hypertension, Diabetes, Blood disorders, Accidents and Renal diseases, which need repeated hospitalization to manage these chronic cases [43]. Hospitalization might prone majority of patients to many nosocomial infections including Hepatitis B infection [44]. For example, those patients of renal failure who are dependent on dialysis might be regularly exposed to these viruses. Frequent episodes of dialysis might expose patients to Hepatitis B virus infection and increases chance of getting disease by 100%, provided no prior vaccination is done against Hepatitis B [45]. Another aspect is that, diagnosed patients of Hepatitis B are refused for renal transplantation too and they survive only at the mercy of Haemodialysis and become a source of infecting many other non-vaccinated dialysis dependent patients [45]. Hepatitis B is one of those viral diseases, which have low cure and it is only preventable disease only with 3 doses of vaccine in 7 months period on three days for 10 minutes time consumption only [46]. Despite of the easy access to the vaccine, vaccine coverage in Pakistan is not 100% [47,48].

Furthermore, Hepatitis B vaccine needs very low temperature to maintain its efficacy but cold chain maintenance has become difficult now in many area of Pakistan due to issue of Load shedding of Power [24]. Moreover, health care workers are on high risk for getting Hepatitis B infection, as they are exposed to virus while taking care of patients. Surprisingly it has been found that prevalence of vaccination among these health workers who handle blood samples in laboratory is low [49]. Another risk factor of acquiring Hepatitis B among unvaccinated population is due to increased prevalence of severe anaemia (haemoglobin level less than 8 mg/dl) in women of all ages which need emergency blood transfusion [50]. Although such women are saved from many outcomes of severe anaemia but unfortunately these women might develop blood borne diseases including Hepatitis B [50]. Risk of infection increases particularly when urgent blood transfusion is required, without proper screening of blood [50]. However, Government has implemented many policies to run these blood banks in country but proper screening of blood for many viral diseases is not done everywhere [51].

Similarly, multiple outbreaks of Dengue and Malaria in different areas of Pakistan have increased the need to transfuse platelets immediately among patients who develop severe thrombocytopenia. This in turn increases the risk of many blood borne diseases including Hepatitis B [51]. Non-formal health care providers including quacks are considered as another biggest source of Hepatitis B transmission

[16]. It is estimated by “WHO” that more than half a million quacks are practicing across Pakistan. They also increase the risk of many communicable diseases and are responsible for increasing the mortality rate in the country mainly due to unhygienic practice. Due to poverty and illiteracy, people prefer to go to Quacks for prompt and cheap treatment [52-54]. In many such cases, people with mild problems, which can be addressed even without treatment end up with another viral diseases by reusing injections. This transmission becomes problematic if this viral disease is lethal and un-curable or patients cannot afford the cost of treatment [52-54].

Role of Socio-cultural Barriers in Increased Burden of Hepatitis B

Poverty

Many infectious diseases including Hepatitis B is rooted in the poverty. Many poor people have no access to Hepatitis B vaccination due to its cost. Furthermore, it is not easily approached by everyone due to its availability in few selected areas with very low number of trained vaccinators. Poverty is also curse when patient has to prefer cheaper hospitals or clinics (where majority of practitioners are Quacks) and where proper sterilization of instruments is not practiced [55].

Ignorance of vaccination

Pakistan has adapted the strategy of expanded programme on immunization (EPI) [56]. Despite of this national strategy, all children have not been vaccinated against Hepatitis B. Majority of educated people despite knowing the benefits of vaccination ignore it by saying that we have many other more important works to do instead of vaccination [56].

Cultural and traditional activities prevailing in society

In Pakistan many festivals are celebrated mainly on shrines of religious persons as annual fairs. Many unhealthy activities like tattooing and piercing nose or ears are very popular in these fairs and people enjoy them without knowing the risk of infections [42,57]. People use to promise on shrines that we will come in next fair soon provided we get married on time and will go through balding process. This can become hazardous if blade is not changed or razor is not sterilized properly by that barber who is even not aware of hazards of his job [42]. This sterilization is very difficult to manage in fairs due to lack of many facilities, which are needed for proper sterilization [58].

Practice of shaving at barbers

Barbers are well known for transmitting the Hepatitis B in many backward, remote areas. This will become more common in some urban areas due to increased population and increased prevalence of viral diseases like Hepatitis B in major cities [28].

Lack of sterilization facilities and infection control policies

Many of dental practitioners are working in small size clinics, where sterilization is not easy to do. Thus availability of autoclave for sterilization of instruments is uncertain in many small hospitals, particularly in dental clinics. Moreover, it has also been found that many dentists are not vaccinated³, thus they are also at risk of getting multiple infectious diseases including Hepatitis B and this can be vice versa [59].

Cultural norms and myths about vaccines

It is commonly perceived by many people in rural areas and urban slums that vaccines will make them infertile. Moreover people also think that vaccines are available free of cost in the public hospitals for Government's own benefit to make them infertile [60].

Social issues

In our society males are on high risk of developing diseases due to their frequent and continuous exposure to barbers and blood donors under unhygienic conditions of blood banks. Ultimately they become sources of transmitting these diseases to their wives and other family members.

Issue of law enforcement

Private health sector is not regularized by Government of Pakistan therefore general practitioners misuse the treatment options and expose patients to unnecessary injections even for symptomatic treatment which can be done only by oral medications or lifestyle changes. For example, simple Flu and simple weakness is treated with IM (intramuscular) and IV (Intravenous) Injections by majority of quacks and general practitioners.

Increased number of Quacks: Access to cheaper treatment and general practitioners is rooted in the poverty. This increased demand for easily available doctors in every street has given an opportunity to quacks to get benefit of this demand in the absence of any strict Law in country [61]. People prefer to visit these quacks mainly due to financial constraints. Quacks maintain their visiting fee at very low level to attract these patients in their clinics. These quacks use one syringe on many patients despite of knowing the risks of reusing same injection for many patients. Many quacks and general practitioners unnecessarily treat their patients with injectable medicines for quick relieve of symptoms and to earn more money by charging them for injection administration charges [62]. Another issue is the fake advertisement of easy and cheaper treatments for Hepatitis B and C by quacks. This distracts people from getting vaccination against this dangerous disease.

IV Drug users: Numbers of IV drug users are increasing day by day due to increased prevalence of psychological diseases and lack of good law enforcement in country. This has also increased risk of many viral diseases with increased risk of Hepatitis B [63].

Conclusion

Hepatitis B is a deadly infectious disease, which can be prevented by vaccination and many other preventive measures. Multiple social and cultural barriers prevailing in the country have played important role in increased burden of this disease in the society. Public awareness needs to be created in the general population along with law enforcement by the Government to regularize the non- formal and private health sector. Moreover, vaccination programs are required to improve the overall vaccination coverage. Government needs to make innovative strategies according to the social and cultural context of country.

References

1. Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, et al. (2013) Global health 2035: a world converging within a generation. *Lancet* 382: 1898-1955.
2. Khan FS (2013) The burden of non-communicable disease in transition communities in an Asian megacity: baseline findings from a cohort study in Karachi, Pakistan. *PLoS one* 8: 56008.
3. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, et al. (2012) Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 380: 2095-2128.
4. Witter S (2015) State-building and human resources for health in fragile and conflict-affected states: exploring the linkages. *Human resources for health*. 13: 33.
5. Mumtaz Z (2014) Improving maternal health in Pakistan: toward a deeper understanding of the social determinants of poor Women's access to maternal health services. *American J Publ H*. 104: 17-24.
6. Bhutta ZA, Sommerfeld J, Lassi ZS, Salam RA, Das JK (2014) Global burden, distribution, and interventions for infectious diseases of poverty. *Infect Dis Poverty* 3: 21.
7. Anwar M, Green J, Norris P (2012) Health-seeking behavior in Pakistan: A narrative review of the existing literature. *Public Health* 126: 507-517.
8. Vaswani AS (2010) Hepatitis B Vaccination status among Health care workers at civil hospital Karachi. *Medical Channel* 16: 45-51.
9. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, et al. (2008) Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* 371: 243-260.
10. Rasul G (2014) Food, water, and energy security in South Asia: A nexus perspective from the Hindu Kush Himalayan region. *Environmental Science & Policy* 39: 35-48.
11. Arif GM (2014) Child malnutrition and poverty: the case of Pakistan. *Pakistan Development Review* 53: 29-48.
12. Berhan Y, Berhan A (2014) Reasons for Persistently High Maternal and Perinatal Mortalities in Ethiopia: Part II-Socio-Economic and Cultural Factors. *Ethiop J Health Sci* 24: 137-148.
13. Ezeh AC, Bongaarts J, Mberu B (2012) Global population trends and policy options. *Lancet* 380: 142-148.
14. Pasha O (2015) Maternal and newborn outcomes in Pakistan compared to other low and middle income countries in the Global Network's Maternal Newborn Health Registry: an active, community-based, pregnancy surveillance mechanism. *Reprod Health* 12: 15.
15. Bennett J (2013) 2012-13 Pakistan Demographic and Health Survey (PDHS). Fact sheet. *Iran J Reprod Med* 11: 761-766.
16. Nishtar S, Boerma T, Amjad S, Alam AY, Khalid F, et al. (2013) Pakistan's health system: performance and prospects after the 18th Constitutional Amendment. *Lancet* 381: 2193-2206.
17. Kouadio IK (2012) Infectious diseases following natural disasters: prevention and control measures. *Expert Rev Anti Infect Ther* 10: 95-104.
18. Guerrant RL, Walker DH, Weller PF (2011) Tropical infectious diseases: principles, pathogens and practice. 3rd (eds.) Elsevier Health Sciences.

19. Khan J (2015) A Study of Socio-Economic Status (SES) Associated with Epidemiology of Tuberculosis in General Population of District Buner, Khyber Pakhtunkhwa (KPK), Pakistan. *O A Lib J* 2: 1-8.
20. Sultan F, Khan A (2013) Infectious diseases in Pakistan: a clear and present danger. *Lancet* 381: 2138-2140.
21. Qazi J (2016) End of Year 2015 in Polio Endemic Pakistan: Yet Another Beginning Towards End. *Food Environ Virol* 8: 109-111.
22. Khan SM (2014) Ethno-ecological importance of plant biodiversity in mountain ecosystems with special emphasis on indicator species of a Himalayan Valley in the northern Pakistan. *Ecological Indicators* 37: 175-185.
23. Khan TM, Sahibzada MUK (2016) Challenges to health workers and their opinions about parent's refusal of oral polio vaccination in the Khyber Pakhtoon Khawa (KPK) province, Pakistan. *Vaccine* 34: 2074-2081.
24. Khan MU, Ahmad A, Aqeel T, Salman S, Ibrahim Q, et al. (2015) Knowledge, attitudes and perceptions towards polio immunization among residents of two highly affected regions of Pakistan. *BMC Public Health* 15: 1100.
25. El-Serag HB (2012) Epidemiology of viral hepatitis and hepatocellular carcinoma. *Gastroenterology* 142: 1264-1273.
26. Trépo C, Chan HL, Lok A (2014) Hepatitis B virus infection. *Lancet* 384: 2053-2063.
27. World Health Organization (2002) Hepatitis B.
28. Enemuor SC, Atabo AR, Oguntibeju OO (2012) Evaluation of microbiological hazards in barbershops in a university setting. *Scientific Research and Essays* 7: 1100-1102.
29. Lai CL, Ratziu V, Yuen MF, Poynard T (2003) Viral hepatitis B. *Lancet* 362: 2089-2094.
30. Ott JJ (2012) Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. *Vaccine* 30: 2212-2219.
31. Perz JE, Armstrong GL, Farrington LA, Hutin YJ, Bell BP (2006) The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide. *J Hepatol* 45: 529-538.
32. Khattak ST, Ali Marwat M, Khattak Iu, Khan TM, Naheed T (2009) Comparison of frequency of hepatitis B and hepatitis C in pregnant women in urban and rural area of district Swat. *J Ayub Med Coll Abbottabad* 21: 12-15.
33. Datamonitor MRF (2016) High hepatitis B & C prevalence in Asia highlights a need for more efficacious and affordable therapies.
34. Chowdhury A (2005) Community-based epidemiology of hepatitis B virus infection in West Bengal, India: Prevalence of hepatitis B e antigen-negative infection and associated viral variants. *J Gastroenterol Hepatol* 20: 1712-1720.
35. Afridi UK (2014) Vertical Transmission of Hepatitis B Virus: A Major Risk Factor for Chronic Pediatric HBV Infection: A Case Report. *J Appl Environ Biol Sci* 4: 520-522.
36. Khalida K (1997) Situation of hepatitis in Pakistan and preparation of diagnostic reagents for the detection of HBsAg ELISA. Ph. D thesis.
37. Shah HD (2014) Unsafe injection practices: An occupational hazard for health care providers and a potential threat for community: A detailed study on injection practices of health care providers. *Int J H Ald Sci* 3: 28.
38. Aziz MS (2006) Prevalence of anti-hepatitis C antibodies and hepatitis B surface antigen in healthy blood donors in Balistan. *Pak Armed Forces Med J* 56: 189-191.
39. Azam M (2007) Blood donor screening for hepatitis and HIV. *Journal of Dow University of Health Sciences*.
40. Mujeeb SA, Pearce MS (2008) Temporal trends in hepatitis B and C infection in family blood donors from interior Sindh, Pakistan. *BMC Infect Dis* 8: 43.
41. Akhtar S, Younus M, Adil S, Jafri SH, Hassan F (2004) Hepatitis C virus infection in asymptomatic male volunteer blood donors in Karachi, Pakistan. *J Viral Hepat* 11: 527-535.
42. Ali SA, Donahue RM, Qureshi H, Vermund SH (2009) Hepatitis B and hepatitis C in Pakistan: prevalence and risk factors. *Int J Infect Dis* 13: 9-19.
43. Jafar TH, Haaland BA, Rahman A, Razzak JA, Bilger M, et al. (2013) Non-communicable diseases and injuries in Pakistan: strategic priorities. *Lancet* 381: 2281-2290.
44. Bereket W, Hemalatha K, Getenet B, Wondwossen T, Solomon A, et al. (2012) Update on bacterial nosocomial infections. *Eur Rev Med Pharmacol Sci* 16: 1039-1044.
45. Fabrizi F, Dixit V, Messa P, Martin P (2015) Transmission of hepatitis B virus in dialysis units: a systematic review of reports on outbreaks. *Int J Artif Organs* 38: 1-7.
46. David MC, Ha SH, Paynter S, Lau C (2015) A systematic review and meta-analysis of management options for adults who respond poorly to hepatitis B vaccination. *Vaccine* 33: 6564-6569.
47. Yousafzai MT, Qasim R, Khalil R, Kakakhel MF, Rehman SU (2014) Hepatitis B vaccination among primary health care workers in Northwest Pakistan. *Int J Health Sci (Qassim)* 8: 67-76.
48. Perveen I (2015) Hepatitis B Seroconversion after Vaccination in Infants in Rural and Urban Areas of Rawalpindi, Pakistan. *British J Med Res* 5: 1557.
49. Kateera F, Walker TD, Mutesa L, Mutabazi V, Musabeyesu E, et al. (2015) Hepatitis B and C seroprevalence among health care workers in a tertiary hospital in Rwanda. *Trans R Soc Trop Med Hyg* 109: 203-208.
50. Xu F, Xianlin XE (2013) SB Center, Infectivity of hepatitis B virus infection in blood transfusion. *Chinese J Bl Transf*, 2: 051.
51. Khattak MF, Salamat N, Bhatti FA, Qureshi TZ (2002) Seroprevalence of hepatitis B, C and HIV in blood donors in northern Pakistan. *J Pak Med Assoc* 52: 398-402.
52. Akhtar P, Muhammad MM (2015) Determinants of Choice of Health Care Provider: A Case Study of Pakistan.
53. Shaikh BT, Hatcher J (2005) Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. *J Public Health (Oxf)* 27: 49-54.
54. Shafiq Y, Shaikh BT, Kumar R (2011) Availability and affordability of essential medicines: exploring the health seeking behaviours and health service utilisation for children under-5 years living in squatter settlement of Karachi, Pakistan. *J Ayub Med Coll Abbottabad* 23: 132-138.
55. Qureshi H (2010) Prevalence of hepatitis B and C viral infections in Pakistan: findings of a national survey appealing for effective prevention and control measures. *East Mediterr Health J* 16: 15.
56. Kazmi K, Khan MAU (2007) Phased introduction of hepatitis B vaccination in Pakistan. *Pakistan J Med Sci* 23: 913.
57. Jafri W, Jafri N, Yakoob J, Islam M, Tirmizi SF, et al. (2006) Hepatitis B and C: prevalence and risk factors associated with seropositivity among children in Karachi, Pakistan. *BMC Infect Dis* 6: 101.
58. Mahboobi N, Porter SR, Karayiannis P, Alavian SM (2013) Dental treatment as a risk factor for hepatitis B and C viral infection. A review of the recent literature. *J Gastrointestin Liver Dis* 22: 79-86.
59. Talaat M (2003) Occupational exposure to needle stick injuries and hepatitis B vaccination coverage among health care workers in Egypt. *Am J Infect Control* 31: 469-474.
60. Khuwaja AK, Qureshi R, Fatmi Z (2002) Knowledge about hepatitis B and C among patients attending family medicine clinics in Karachi. *East Mediterr Health J* 8: 787-793.
61. Hussain S (2012) Alternative and Traditional Medicines Systems in Pakistan: History, Regulation, Trends, Usefulness, Challenges, Prospects and Limitations: INTECH 4th (eds).
62. Khan AJ (2000) Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. *Bulletin of the World Health Organization* 78: 956-963.
63. Nelson PK, Mathers BM, Cowie B, Hagan H, Des Jarlais D, et al. (2011) Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: results of systematic reviews. *Lancet* 378: 571-583.