



Health Sector Response to Viral Hepatitis in the Selected Countries

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ABSTRACT

Viral hepatitis is an important public health concern worldwide. The current study aims to compare prevention and control programs of viral hepatitis in Egypt, Georgia, Pakistan and Australia. This is an international comparative analysis study, which by using document review, Australia, Egypt, Pakistan and Georgia was purposely selected. Then, their national programs in prevention, screening and treatment were compared. For data analysis, the narrative review methodology was used. Hepatitis C and B prevalence in Pakistan was 5 and 2.5%, respectively. Injecting drug use was the main transmission way. Among investigated programs, Georgia was only focused on hepatitis C, although hepatitis B prevalence was 2.9%. In Australia, Strategic program for screening and diagnosis was mainly focused on priority populations, such as those who inject drugs, those who are culturally and linguistically different. To achieve viral hepatitis elimination, countries must focus on its prevention, diagnosis and treatment. Prevention reduces the incidence, screening at risk and high risk groups, and case finding, and affordability and access to treatment for patients.

Key words: Health Sector, Hepatitis, strategy, Elimination

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INTRODUCTION

Viral hepatitis is a public health concern. Nowadays, approximately 340 million are infected with hepatitis and 300,000 are dying annually. Based on the center of the global burden of disease, it is the seventh leading cause of mortality globally. In contrast to important diseases, including HIV/AIDS, tuberculosis and malaria, during the last 15 years, its trend has increased, so that its mortality rate has become higher than HIV/AIDS. Hepatitis B and C are responsible for 66 percent and 33 percent of all mortalities, respectively [1]. Since the 2000s, hepatitis-related mortalities have increased by 22 percent. Sub-Saharan Africa and East-Asia have the highest prevalence of hepatitis B, 5 to 10 percent of adults

are infected [2]. Europe and Eastern Mediterranean regions have the highest prevalence of hepatitis C. In 2015, 1.75 million new infections occurred [3], even regions with low prevalence can experience a hepatitis outbreak. So that, in the United States after years of the low prevalence of hepatitis C, its prevalence has been doubled during 2010 to 2014[4]. The United Nations Sustainable Development Goals have particularly emphasized on combating viral hepatitis, and the world health assembly in May 2016 emphasized on eradication of hepatitis B and C by 2030 for all member countries. As well, the WHO developed its global health sector strategy to eliminate viral hepatitis and member countries are obliged to achieve it. WHO regional offices have started to develop plans to fulfill these objectives, and simultaneously countries are developing their national programs to eliminate viral hepatitis. With regard to the importance of hepatitis C and its consequences for societies, the

current study has compared national health programs of selected countries to combat this disease in prevention, screening and diagnosis areas.

MATERIALS AND METHODS

Design

This is an international comparative analysis design and original article, which is used a comprehensive literature review to assess and evaluate the national programs and policies of selected countries.

Country selection

We Use a combination of literature review and receiving opinions from expert panel, which consist of 10 experts, to selection of countries. By doing so, the countries of Egypt, Pakistan, Australia, and Georgia were selected. Selection criteria for choosing these countries are described in table 1. It should be mention that all member of expert panel had at least 10 years experiences in hepatitis prevention and control programs at both national and international level.

Table 1: Reasons of choosing national programs

Countries	Reason	Programs
Australia	Advanced in prevention and control of hepatitis (6)	Second National Hepatitis B strategy 2014-2017 Fourth National Hepatitis C Strategy 2014-2017
Egypt	Highest prevalence of hepatitis C world widely(7)	Plan of Action for the Prevention, Care & Treatment of Viral hepatitis, Egypt 2014-2018
Pakistan	The highest prevalence of hepatitis C, after the Egypt(7)	National hepatitis strategic framework (NHSF) for Pakistan 2017-2021
Georgia	Globally, Georgia as the highest probability of eliminating hepatitis C by 2020 (8)	Strategic plan for the Elimination of hepatitis C virus in Georgia, 2016-2020

Ethical Consideration

The Ethics Committee for Research at the Tehran University of Medical Sciences approved the study (IR.TUMS.SPH.REC.1395.1541).

Data collection and analysis

A search n Web of Science, Pub MED, and Google Scholar for articles that included the terms

strategic plan, viral hepatitis, policy document, action plan, hepatitis B and hepatitis C was performed. In the following, the prevalence of hepatitis B and C in the selected countries and the main transmission ways were investigated. When all required information was found, national programs were examined in prevention, screening and treatment areas.

RESULTS

First, the prevalence of hepatitis B and C and their contexts are investigated in the selected countries, and then a comparative analysis of these countries in prevention, screening and treatment areas is provided.

Prevalence of hepatitis B and C in Pakistan were 2.5 and 5 percent, respectively, and the prominent transmission way is Injecting Drug Use (IDU) [5, 6]. In Georgia, the prevalence of hepatitis B and C were 2.9 and 5.4 percent, respectively[7]. As well, the primary transmission way is IDU that up to 60 percent of addicted are infected with hepatitis C (15). In Egypt, the prevalence of hepatitis B and C are 1.7 and 10 percent, respectively, which medical procedures, particularly unsafe injections, is a major transmission way[8, 9]. In Australia, the prevalence of hepatitis B and C are 1.02 and 1.2 percent, respectively, and IDU is the main transmission way [10].

Prevention

In Pakistan, prevention programs include harm reduction, injection safety, and vaccination. The harm reduction program, which its coverage is too low, is focused on the free distribution of syringe for IDUs, while it does not cover vaccination, condom distribution, and treatment. It is more focused on HIV, HBV, and HCV. Coverage of vaccination, condom and diagnostic examinations for those families that have an addicted member is planned. Since 2002, hepatitis B vaccine has covered by EPI, and its injection plan is 6, 10 and 14 weeks after the birth, and its coverage for neonatal reached 56 per cent. There is no birth dose of HBV vaccine. In twenty percent of injections, second-hand syringes were used, which can increase the prevalence, while it's using is prohibited. It's worth noting that about 20 percent of health personnel were not vaccinated.

In Georgia, prevention programs include harm reduction, infection control and prevention in health facilities, infection control in non-

traditional health care and community settings, and vaccination. Harm reduction comprises of two parts: (1) NSP programs; and (2) Opioid substitution treatment. The harm reduction program faces challenges such as considering the drug injection as a punishable crime, which was a significant barrier for IDUs. Financial coverage is another challenge, which international donors finance a part of it and IDUs pay the remaining – there was no governmental participation. Then, the primary barrier of opioid substitution treatment in a harm reduction program was out-of-pocket payments. Harm reduction programs should have been expanded to increase diagnosis and treatment rates of hepatitis C. Inappropriate sterilization of equipment, and unsafe injections in healthcare facilities are among other challenges with this program, which has focused on viral hepatitis prevention through regulations to deal with improper sterilization of equipment, health personnel vaccination, and unsafe injection. Also, tattoo, and piercing salons and acupuncture clinics were important places for the disease transmission, which policies were developed to deal with them. It's worth noting that since 2002, hepatitis vaccination has been performing at the Georgia (coverage rate is 93.7%) [11].

In Egypt, prevention programs include infection control practices, training providers and communities, vaccine, and blood safety. A medical procedure, particularly unsafe injection, is an important transmission way, which some programs have been developed to deal with this issue. Blood collection performs by 14 institutions and stores by 400 blood banks. Egypt blood provision system comprises of different layers, including blood donor selection, testing of blood units, safe transportation and transfusion of blood products. As well, there were policies to provide safe blood in the current program. In most parts of the EPI program, three-dose schedule of hepatitis B vaccination for infants met the 97 percent coverage. High risk and birth dose injection are also included. Moreover, training is provided for healthcare and community health workers about transmission ways of the disease and safe injection in the Egypt national program to prevent and control viral hepatitis. In Australia, vaccination coverage was 94 percent, while in Torres Strait Islander children's group was 85 percent. Four-dose schedule of hepatitis B vaccination was planned (given at birth, two, four and six months of age), but it was faced with an information shortage challenge on dose coverage

at birth. More information is required. As well, its national program has focused on vaccination of family members and partners of infected persons.

A harm reduction program comprised of two parts: (1) opioid substitution treatment (OST); and (2) Needle and Syringe Programs (NPSs). More than 90 percent of hepatitis C was due to unsafe injecting drug use. For this reason, the NSPs were cost-effective. In the current program, people who inject drugs are in priority. As well, the harm reduction programs emphasize on evidence-based harm reduction.

Treatment

In Pakistan, since 2015 hepatitis C medicines, Sofosbuvir, and Ribavirin have been providing by the public sector. Up to 2016, approximately 165,000 were treated. Daclatasvir and Velpatasvir are only offered in the private sector. The current program has developed policies to address this issue and emphasized on strengthening the association between diagnosis and treatment.

In Georgia, since 2014, combination therapy including, Sofosbuvir along with Pegylated interferon and Ribavirin has become available. In addition, since 2016, after contracting with Gilead Sciences Company, Sofosbuvir/Ledipasvir has been publicly available. As well, since the mid of 2016, Sofosbuvir/ Velpatasvir has become available for hepatitis C treatment. Inadequate healthcare facilities and human resources, particularly physicians, to provide treatments for the hepatitis C are among the leading problems. A series of policies were developed to address these challenges.

In Egypt, a national treatment program for hepatitis C, as the most significant national program, was faced with resource scarcity. The government, insurance companies, and patients' contributions were 40, 50 and 10 percent, respectively.

From 2007 to 2014, the standard treatment was based on the Pegylated interferon and ribavirin; then sofosbuvir was included in the treatment in 2014. So that, the current treatment is and Daclatasvir plus Sofosbuvir ± Ribavirin [12]. Domestic production is recommended to address financial limitations and increase the stability of the program.

In Australia, since 2014, direct-acting antiviral have been provided using public budgets.

However, it was limited. Since 2016, a treatment including Sofosbuvir/Ledipasvir and Sofosbuvir/Daclatasvir, which costs 6 to 37 dollars monthly has been providing to patients [13, 14]. To increase access to the treatment, engagement of general physicians and primary health care centers was emphasized. As well, these programs were emphasizing on raising awareness about hepatitis, so that more people receive diagnostic tests.

Screening

In Pakistan, three million blood units were injecting annually, which screening of 65 percent of them was not standard. As well, pregnant women were not screened for hepatitis B. The current program contains pregnant women screening for hepatitis B. With regard to the inadequate information, no intervention has been developed to screen high-risk groups in Pakistan, but the current program includes policies to cover high-risk groups screening.

In Georgia, there were programs to screen blood donors, prisoners, IDUs, and pregnant women for hepatitis C and HIV, while high-risk groups such as sex workers, and men who have sex with men (MSM) were not screened. Although diagnostic tests were available in Tbilisi, some settings with high prevalence were not covered adequately by

these tests. There were no subsequent tests for screened individuals, and diagnosed patients were not receiving treatment. In the current study, screening expansion and more attention to high-risk groups are emphasized.

In Egypt, screening programs for blood products and pregnant women (older than 15 years old) were available. Due to the high prevalence of hepatitis C in the general population, the transmission possibility of hepatitis C through blood products is high. Also, Egypt Blood Transfer organization has not unified stewardship – different organizations were in charge of blood collection. The current program has considered measures to increase monitoring of blood banks to provide blood products safely.

In Australia, the primary focus of the strategic program for screening and diagnosis is on priority populations, such as IDUs, alcoholic, and peoples who culturally and linguistically have diverse backgrounds. Moreover, evaluation of individuals based on the risk factors, increasing the awareness of particular groups about diagnostic tests, and the role of primary health care services in high prevalence areas were emphasized. A brief description of programs of selected countries in prevention, screening and treatment arenas is provided in table 2.

Table 2: A summary of the programs of prevention, treatment and screening in selected countries

Countries	Treatment	Screening	Prevention
Australia	Sofosbuvir/Ledipasvir Sofosbuvir+ Daclatasvir	Screening of pregnant women for hepatitis B	Vaccination; Harm reduction
Egypt	Sofosbuvir + Daclatasvir	screening of blood and blood products Screening for HBV in pregnant woman	Infection Control practices; Blood safety Vaccine; Educating Providers and Communities
Georgia	Sofosbuvir/Ledipasvir Sofosbuvir/Velpatasvir	HCV testing for pregnant women HCV testing to prisoners HCV testing among blood donors HCV testing for PWID HCV testing among people living with HIV	Harm reduction (providing needle/syringe programs (NSP) and opioid substitution treatment (OST) services); infection control in non-traditional healthcare and other community settings; prevent healthcare infection; Blood safety; Vaccination
Pakistan	Sofosbuvir and Ribavirin	screening of all blood donations for Hepatitis B and C screening of pregnant women for hepatitis B surface antigen in future	Injection safety(Single-use or auto-disable syringes are a low priority in most healthcare facilities) Harm reduction providing harm reduction services to PWIDs through syringe exchange services vaccine

CONCLUSION

The current study is among the first studies that have compared national programs of different

countries for the hepatitis C. According to the best knowledge of the authors, there is no similar study. In line with the main goal of the study,

Georgia, Pakistan, Egypt, and Australia were selected.

Among investigated programs, although the prevalence of hepatitis B in Georgia was 2.9 percent, its program was only focused on hepatitis C. According to the WHO program for hepatitis elimination, appropriate measures to address hepatitis B must be included in Georgia's national program for hepatitis elimination. Although Egypt and Pakistan didn't have a separate program for hepatitis, they emphasized on hepatitis B and C in a unified program.

Among selected countries, Australia was the only nation that has separate programs on hepatitis B and C. It seems that employing different programs pave the way for elimination of hepatitis. Exploring preventive, diagnostic and curative programs revealed that selected countries have planned for prevention and control of hepatitis. In Egypt, for instance, the unsafe injection was the main way of transmission. Thus, measures were developed to increase injection safety. As well, in three other countries, drug injection was the main transmission way, which the primary emphasis of the programs was on harm reduction.

Except for Pakistan, in other selected countries neonatal vaccination coverage was more than 90 percent. Therefore, it is crucial to develop policies to increase the coverage. Previous studies showed that the following factors have played an important role in low coverage in Pakistan: inadequate knowledge regarding the vaccination benefits, particularly maternal literacy; residence in rural areas; poor socioeconomic status; and distance to immunization facilities [15]. Aatekah Owasi showed that educational interventions, mainly to increase maternal literacy, is among the main factors that influence the level of neonatal vaccination coverage in Pakistan [16]. In Egypt, different organizations are participating in the field of blood products, which results in lack of unified stewardship and increase the possibility of unsafe blood. Therefore, having unified stewardship is necessary. In Georgia, barriers such as payments for methadone maintenance treatment and addicted person's punishment, have delayed elimination of hepatitis C, then, it is needed to allocate public funds for these programs, and also the national law should be revised.

All countries were using Sofosbuvir medicine to eliminate hepatitis C. In Egypt, because of the high prevalence and a high percentage of the adult population, different sources of financing are employed. Recently, the Egyptian government has increased hepatitis budget. Also, the United States Centers for Disease Control and Prevention, Pasteur Institute and WHO are supporting its national program.

With regard to the high prevalence of hepatitis in Egypt, a holistic screening approach is required, that due to high costs of diagnosis, screening programs in areas with high prevalence can be cost-effective [17]. But in Pakistan, Georgia, and Australia, because of the high prevalence among IDUs, screening programs will be cost-effective [18]. Appropriate monitoring of different programs of the health system is crucial. Monitoring results in the identification of new ways of disease transmission and prevalence estimation among high and at-risk groups. Also, appropriate policies will be developed based on the prevalence of hepatitis B and C so that countries can move toward elimination [19].

The lack of similar studies and inadequate access to national programs were the main limitations of the current study. To address these limitations, required information was received from other researchers.

It is suggested the future studies investigate broader national programs in the level of inter-continental and extra-regional.

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REFERENCES

1. National Academies of Sciences, E., Medicine, Health, D. Medicine, H. Board on Population, P. Public Health and B. Committee on a National Strategy for the

- Elimination of Hepatitis (2017). A National Strategy for the Elimination of Hepatitis B and C: Phase Two Report. B. L. Strom and G. J. Buckley. Washington (DC), National Academies Press Copyright 2017 by the National Academy of Sciences. All rights reserved.(US)<https://www.cabdirect.org/cabdirect/abstract/201831052790mar>,
2. Stanaway, J. D., A. D. Flaxman, M. Naghavi, C. Fitzmaurice, T. Vos, I. Abubakar, L. J. Abu-Raddad, R. Assadi, N. Bhala and B. Cowie (2016). "The global burden of viral hepatitis from 1990 to 2013: findings from the Global Burden of Disease Study 2013." *The Lancet* 388(10049): 1081-1088.<https://www.sciencedirect.com/science/article/pii/S0140673616305797>
 3. Mohsen, A., A. Bernier, L. LeFouler, E. Delarocque-Astagneau, M. El-Daly, S. El-Kafrawy, S. El-Mango, M. Abdel-Hamid, M. Gadallah and G. Esmat (2015). "Hepatitis C virus acquisition among Egyptians: analysis of a 10-year surveillance of acute hepatitis C." *Tropical Medicine & International Health* 20(1): 89-97.
<https://onlinelibrary.wiley.com/doi/full/10.1111/tmi.12410>
 4. National Academies of Sciences, E. and Medicine (2016). *Eliminating the public health problem of hepatitis B and C in the United States: phase one report*, National Academies Press.
<https://www.cabdirect.org/cabdirect/abstract/20183105279>
 5. Qureshi, H., K. Bile, R. Jooma, S. Alam and H. Afridi (2010). "Prevalence of hepatitis B and C viral infections in Pakistan: findings of a national survey appealing for effective prevention and control measures." *Eastern Mediterranean Health Journal* 16: S15.
<https://insights.ovid.com/hepatology/hepa/2015/10/001/hepatitis-eliminated-high-disease-burden-country/1872/01515467>
 6. Ashraf, S. and A. Ahmad (2015). "Viral hepatitis in Pakistan: challenges and priorities." *Asian Pacific Journal of Tropical Biomedicine* 5(3): 190-191.
<https://www.sciencedirect.com/science/article/pii/S2221169115>
 7. Gvinjilia, L. (2016). "National progress toward hepatitis C elimination—Georgia, 2015–2016." *MMWR. Morbidity and mortality weekly report* 65.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5657814>
 8. El-Akel, W., M. El-Sayed, M. El Kassas, M. El-Serafy, M. Khairy, K. Elsaed, K. Kabil, M. Hassany, A. Shawky and A. Yosry (2017). "National treatment programme of hepatitis C in Egypt: Hepatitis C virus model of care." *Journal of viral hepatitis* 24(4): 262-267.
<https://www.ncbi.nlm.nih.gov/pubmed/28145032>
 9. Ismail, S. A., D. F. Cuadros and L. Benova (2017). "Hepatitis B in Egypt: a cross-sectional analysis of prevalence and risk factors for active infection from a nationwide survey." *Liver international*.
<https://www.ncbi.nlm.nih.gov/pubmed/28481452>
 10. Allard, N. L., J. H. MacLachlan and B. C. Cowie (2015). "The cascade of care for Australians living with chronic hepatitis B: measuring access to diagnosis, management and treatment." *Australian and New Zealand journal of public health* 39(3): 255-259.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/1753-6405.12345>
 11. Kasradze, A., G. Kuchukhidze, D. Baliashvili, S. Salyer, A. Gamkrelidze, M. Tsereteli, N. Chitadze, M. Alkhazashvili, K. Zakhshvili and J. Drobeniuc (2017). "Prevalence and risk factors for hepatitis B infection in the adult population of Georgia: a nationwide survey." *Journal of Hepatology* 66(1): S468-S469.
[http://www.journal-of-hepatology.eu/article/S0168-8278\(17\)31324-7/abstract](http://www.journal-of-hepatology.eu/article/S0168-8278(17)31324-7/abstract)
 12. H. W. El Akel, T. Elbaz, M. El Kassas, K. Elsaed, H. El Shazly, M. Said, M. Yousif, A. Gomaa and A. Nasr (2018). "Generic daclatasvir plus sofosbuvir, with or without ribavirin, in treatment of chronic hepatitis C: real-world results from 18 378 patients in Egypt." *Alimentary pharmacology & therapeutics* 47(3): 421-431.
<https://onlinelibrary.wiley.com/doi/abs/10.1111/apt.14428>
 13. Iversen, J., J. Grebely, L. Topp, H. Wand, G. Dore and L. Maher (2014). "Uptake of hepatitis C treatment among people who inject drugs attending Needle and Syringe Programs in Australia, 1999–2011." *Journal of Hepatology* 60(1): 102-109.
https://scholar.google.com/scholar?cluster=9151379623043882524&hl=fa&as_sdt=0,5

- of viral hepatitis 21(3): 198-207. <https://onlinelibrary.wiley.com/doi/full/10.1111/jvh.12129>
14. Hajarizadeh, B., J. Grebely, G. V. Matthews, M. Martinello and G. J. Dore (2017). "Uptake of direct acting antiviral treatment for chronic hepatitis C in Australia." *Journal of viral hepatitis*. <https://onlinelibrary.wiley.com/doi/full/10.1111/jvh.12852>
15. Khowaja, A. R., U. Zaman, A. Feroze, A. Rizvi and A. K. Zaidi (2015). "Routine EPI coverage: subdistrict inequalities and reasons for immunization failure in a rural setting in Pakistan." *Asia Pacific Journal of Public Health* 27(2): NP1050-NP1059. <http://journals.sagepub.com/doi/abs/10.1177/1010539511430850>
16. Owais, A., B. Hanif, A. R. Siddiqui, A. Agha and A. K. Zaidi (2011). "Does improving maternal knowledge of vaccines impact infant immunization rates? A community-based randomized-controlled trial in Karachi, Pakistan." *BMC public health* 11(1): 239. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-11-239>
17. Kim, D. D., D. W. Hutton, A. A. Raouf, M. Salama, A. Hablas, I. A. Seifeldin and A. S. Soliman (2015). "Cost-effectiveness model for hepatitis C screening and treatment: implications for Egypt and other countries with high prevalence." *Global public health* 10(3): 296-317. <https://www.tandfonline.com/doi/abs/10.1080/17441692.2014.984742>
18. Rein, D. B., J. S. Wittenborn, B. D. Smith, D. K. Liffmann and J. W. Ward (2015). "The cost-effectiveness, health benefits, and financial costs of new antiviral treatments for hepatitis C virus." *Clinical infectious diseases* 61(2): 157-168. <https://www.ncbi.nlm.nih.gov/pubmed/25778747>
19. Hutin, Y., D. Low-Bear, I. Bergeri, S. Hess, J. M. Garcia-Calleja, C. Hayashi, A. Mozalevskis, A. R. Stengaard, K. Sabin and H. Harmanci (2017). "Viral Hepatitis Strategic Information to Achieve Elimination by 2030: Key Elements for HIV Program Managers." *JMIR public health and surveillance* 3(4). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5747598/>