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February 20, 2014

Dear Editor,

Kindly find enclosed our revised manuscript in Word format (file name: Assessing the potential for HIV parenteral_revised.doc), along with a point-by-point reply to the reviewers' comments below.

Title: The potential for HIV parenteral transmission in the Middle East and North Africa: An analysis using hepatitis C virus as a proxy biomarker
Author: Yousra A. Mohamoud, F. DeWolfe Miller and Laith J. Abu-Raddad
Name of Journal: *World Journal of Gastroenterology*
ESPS Manuscript NO: 8061

We would like to thank you and the reviewers for your valuable feedback and suggestions, and the critical appraisal of our work. This input has enriched our article. In this revised version of the manuscript, and in our reply to the reviewers, we have addressed each of the reviewers' comments and suggestions, and would be pleased to accommodate any other, should the reviewers or editor have any further suggestions.

We thank you for your time and consideration.

Yours sincerely,

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The potential for HIV parenteral transmission in the Middle East and North Africa: using hepatitis C virus as a proxy biomarker

Yousra A. Mohamoud, F. DeWolfe Miller and Laith J. Abu-Raddad

REPLY TO REVIEWERS' COMMENTS

We thank the reviewers for assessing our work and for the valuable feedback and suggestions. Please find below a point-by-point reply that addresses each of the reviewers' comments. We have also incorporated these suggestions in the revised manuscript as noted below. We would be pleased to address any further points that the editor or reviewers may find unsatisfactory.

Note: All references to the revised manuscript pertain to the marked copy of this file (found below) including changes implemented through "track changes".

Reviewers' comments

Reviewer #1:

Mohamoud et al. compared with the prevalence of HCV infection data between general population and high risk population groups to assess the potential for HIV parenteral transmission in MENA. They concluded that it should be need to be implemented to avoid the unnecessary spread of HIV, HCV, and other blood-borne pathogens along the parenteral modes of transmission. This seems an important issue in this field.

We thank the reviewer for the thorough review of our work and the constructive feedback. We also appreciate the reviewer's valuable suggestions and comments that have enriched this article. Kindly find below our detailed replies addressing the reviewer's comments.

1) *Table 1 shows the prevalence of HCV, however, this reviewer wants to ask the authors how the detection methods: HCV RNA by RT-PCR or anti-HCV antibodies by ELISA? There are the same questions in Tables 2 and 3.*

We thank the reviewer for this comment, and recognize that this is a salient issue which needs clarification. All prevalence measures included in this review were from studies which measured hepatitis C virus (HCV) prevalence based on the presence of anti-HCV antibodies. To clarify this in the manuscript we updated the "Prevalence (%)" heading in Table 1, Table 2 and Table 3 to read "Seroprevalence (%)". We have also clarified in two instances, in the abstract and introduction, that we are discussing here antibody prevalence.

2) *In Abstract, ….. , we use the prevalence of HCV infection data among general population and…? ….. Relatively low prevalence of HCV infection in the general population…..*

We have corrected the sentence as the reviewer suggested by clarifying the prevalence in the abstract as "HCV infection" (Page 10, Abstract). Specifically the two sentences now read:

"Relatively low prevalence of HCV infection in the general population groups was reported in most MENA countries indicating that parenteral HIV transmission at endemic levels does not appear to be a cause for concern."

3) *In Introduction section, …..human immunodeficiency virus (HIV); acquired immune deficiency syndrome (AIDS).*

We thank the reviewer for this suggestion. We have defined the acronyms in the introduction (Page 11, Paragraph 3). Specifically the paragraph now reads:

"These include the world's largest iatrogenic transmission of a blood-borne pathogen; the hepatitis C virus (HCV) epidemic in Egypt during the era of parenteral antischistosomal therapy (PAT)[1], and two human immunodeficiency virus (HIV) outbreaks in renal dialysis centers also in Egypt[2, 3]. The region has also witnessed the largest documented nosocomial outbreak in HIV and acquired immune deficiency syndrome (AIDS) history which occurred in a children's hospital in Libya and involved 402 children, 19 mothers (through breast feeding), and two nurses[4-6]."

4) *Authors may mention about the prevalence of HBV in Discussion section.*

We thank the reviewer for this insightful comment. We have modified the text (Page 17, Paragraph 3) in the revised manuscript to cite the exact proportions of incident HBV and HCV infections in MENA that are attributable to contaminated injections. The paragraph now states:

"While there is a very limited risk for sustainable HIV transmission, there remains a concern for other blood-borne and nosocomial infections. MENA has the highest levels of all regions in the proportion of incident HBV (58.3%) and HCV infections (81.7%) that is attributable to contaminated injections[7]. Every year in MENA, contaminated injections appear to be the cause of 2.5 million HBV infection, 645,000 HCV infections, and 2,200 HIV infections[7]."

Additionally, we elaborated on the reduction in HBV prevalence among blood donors in the region in the revised manuscript (Page 18, Paragraph 1). Specifically the paragraph now reads:

"HBV prevalence among blood donors in Turkey fell from 5.98% in 1987 to 2.07% in 2003[116]. Similarly, in Iran HBV prevalence decreased from 3.4-3.5% in 1979-80 to 0.61%in 2005-06[44]. In Egypt, 95% of women in the 2005 Demographic and Health Survey reported that the medical provider followed basic injection safety procedures[8]."

5) Authors should discuss about the HCV genotypes in this area.

We thank the reviewer for the valuable suggestion. We have modified the text (Page 17, Paragraph 2) in the revised manuscript to discuss the variability in the distribution of HCV genotypes in the region and the implications of this heterogeneity on our assessment of the potential for HIV parenteral transmission. The paragraph now states:

"While HCV genotype 4 is the most prevalent in Egypt[9], HCV genotype distribution varies between countries and within countries in the rest of the MENA region. Different HCV genotypes may have different transmission probabilities. This suggests that our ability to use HCV prevalence as a proxy for potential HIV parenteral transmission may be dependent on which genotype is prevalent in MENA countries. However, in their study, Vickerman *et al.* demonstrated that this does not appear to be the case[10-15]."

Reviewer #2:

It is a research work with an acceptable content, given the lack of scientific publications in all MENA countries. It is most often retrospective studies, do not meet the epidemiological criteria themselves. There is no novelty or innovation. However, the manuscript is clear, easy and enjoyable to read. The Research Ethics has been respected.

We thank the reviewer for the thorough review of our work and the constructive feedback. We also appreciate the reviewer's valuable suggestions and comments. Kindly find below our detailed replies addressing the reviewer's comments.

SPECIFIC COMMENTS

The title reflects the subject and details the contents of the main study.

The summary reports clearly background research with defined goals, patients and methods, results argued by studies and a conclusion.

Materials and methods: on the material plane, it is an assessment of the risk of HIV transmission from HCV prevalence in different populations of the MENA region. There is no methods or innovative reproducible assessments. There is no statistical study.

Results: The results provide guidance on the risk of HIV based on the prevalence of HCV.

The discussion is well organized, with adequate theoretical analysis and valid conclusions.

References: The references are adequate, relevant and up to date, however, reference 87 should be amended because HCV prevalence of 30% among hemophiliacs in Algeria is the result of the thesis of Dr. Benchikh from the hematology department of Beni Messous in Algiers presented in 2006 and never published. The authors of reference 87 have merely reproduced the level found by Dr. Benchikh.

The tables reflect the main findings of the study, and are presented appropriately.

personal comments

For information; in the Algerian blood donor (340,000 donations per year), HCV prevalence was estimated in the order of 0.21 % in 2009 and 2010.

In hemodialysis Algerians, HCV prevalence approximately 45 % in 1995 was reduced to 23.8 % (national survey conducted in 9700 patients in 2008).

We thank the reviewer for his valuable feedback on the different parts of this manuscript. Regarding the reviewer's comment on reference 87, we are a little confused. It is our understanding that reference 87 by Saidane et al. entitled "Various complications in haemophiliacs managed by Hospital University of Batna, Algeria" refers to a specific hemophiliac population managed by the hematology department at the University Hospital Ibn Flis Touhami of Batna, in Batna, Algeria. This study was conducted recently, January 2010 to January 2011, and was published in 2011 as an abstract in the Journal of Thrombosis and Haemostasis. It appears to us that the reviewer is referring to a different reference, a study conducted by Dr. Benchikh in the hematology department of Beni Messous, Algeria in 2006. Is this correct? In that case, could the reviewer kindly provide us with the exact reference for this study, and for the two studies mentioned by the reviewer in the personal comments section so we can include them in our review?

Editor's track changes comments:

1) We thank the editor for his suggestions. We have cut down in the number of words in the title to 23 words, but were unable to bring them down to less than 12 words, as requested, while preserving the titles meaningfulness. We would like to request that the editor keep the title as it is, if possible. However, if this request is not feasible we will be happy to take a second attempt at cutting down the title.

2) As requested, all of the editor's other formatting comments have been addressed and changes incorporated in the revised document. PMIDs and DOIs have been added to references with this information available. For most of the studies with no PMID available we have prepared scans of the first pages of these documents and compiled them in one PDF. However, we were unable to find the appropriate location to upload this document in the re-submission link. We will be happy to provide this document when needed.

References:

1 Frank C, Mohamed MK, Strickland GT, Lavanchy D, Arthur RR, Magder LS, El Khoby T, Abdel-Wahab Y, Aly Ohn ES, Anwar W, Sallam I. The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt. *Lancet* 2000; **355**(9207): 887-891 [PMID: 10752705]

2 Hassan NF, el Ghorab NM, Abdel Rehim MS, el Sharkawy MS, el Sayed NM, Emara K, Soltant Y, Sanad M, Hibbs RG, Arthur RR. HIV infection in renal dialysis patients in Egypt. *Aids* 1994; **8**(6): 853 [PMID: 8086148]

3 El Sayed NM, Gomatos PJ, Beck-Sague CM, Dietrich U, von Briesen H, Osmanov S, Esparza J, Arthur RR, Wahdan MH, Jarvis WR. Epidemic transmission of human immunodeficiency virus in renal dialysis centers in Egypt. *J Infect Dis* 2000; **181**(1): 91-97 [PMID: 10608755]

4 Visco-Comandini U, Cappiello G, Liuzzi G, Tozzi V, Anzidei G, Abbate I, Amendola A, Bordi L, Budabbus MA, Eljhawi OA, Mehabresh MI, Girardi E, Antinori A, Capobianchi MR, Sonnerborg A, Ippolito G. Monophyletic HIV type 1 CRF02-AG in a nosocomial outbreak in Benghazi, Libya. *AIDS Res Hum Retroviruses* 2002; **18**(10): 727-732 [PMID: 12167281]

5 de Oliveira T, Pybus OG, Rambaut A, Salemi M, Cassol S, Ciccozzi M, Rezza G, Gattinara GC, D'Arrigo R, Amicosante M, Perrin L, Colizzi V, Perno CF. Molecular epidemiology: HIV-1 and HCV sequences from Libyan outbreak. *Nature* 2006; **444**(7121): 836-837 [PMID: 17171825]

6 Yerly S, Quadri R, Negro F, Barbe KP, Cheseaux JJ, Burgisser P, Siegrist CA, Perrin L. Nosocomial outbreak of multiple bloodborne viral infections. *J Infect Dis* 2001; **184**(3): 369-372 [PMID: 11443566]

7 Hauri AM, Armstrong GL, Hutin YJ. The global burden of disease attributable to contaminated injections given in health care settings. *Int J STD AIDS* 2004; **15**(1): 7-16 [PMID: 14769164 DOI: 10.1258/095646204322637182]

8 Measure DHS. Egypt: Demographic and Health Survey 2005. In: Africa MEaN, ed. Demographic and Health Surveys, 2006.

9 Ramia S, Eid-Fares J. Distribution of hepatitis C virus genotypes in the Middle East. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases* 2006; **10**(4): 272-277 [PMID: 16564719 DOI: 10.1016/j.ijid.2005.07.008]

10 Goldmann DA. Blood-borne pathogens and nosocomial infections. *J Allergy Clin Immunol* 2002; **110**(2 Suppl): S21-26 [PMID: 12170239]

11 Walker PR, Worobey M, Rambaut A, Holmes EC, Pybus OG. Epidemiology: Sexual transmission of HIV in Africa. *Nature* 2003; **422**(6933): 679 [PMID: 12700750]

12 Schmid GP, Buve A, Mugyenyi P, Garnett GP, Hayes RJ, Williams BG, Calleja JG, De Cock KM, Whitworth JA, Kapiga SH, Ghys PD, Hankins C, Zaba B, Heimer R, Boerma JT. Transmission of HIV-1 infection in sub-Saharan Africa and effect of elimination of unsafe injections. *Lancet* 2004; **363**(9407): 482-488 [PMID: 14962531]
13 Vickerman P, Hickman M, May M, Kretzschmar M, Wiessing L. Can hepatitis C virus prevalence be used as a measure of injection-related human immunodeficiency virus risk in populations of injecting drug users? An ecological analysis. *Addiction* 2010; **105**(2): 311-318 [PMID: 19922515 DOI: 10.1111/j.1360-0443.2009.02759.x]
14 Vickerman P, Martin NK, Hickman M. Understanding the trends in HIV and hepatitis C prevalence amongst injecting drug users in different settings--implications for intervention impact. *Drug and alcohol dependence* 2012; **123**(1-3): 122-131 [PMID: 22138540 DOI: 10.1016/j.drugalcdep.2011.10.032]
15 Vickerman P, Martin NK, Roy A, Beattie T, Jarlais DD, Strathdee S, Wiessing L, Hickman M. Is the HCV-HIV co-infection prevalence amongst injecting drug users a marker for the level of sexual and injection related HIV transmission? *Drug and alcohol dependence* 2013; **132**(1-2): 172-181 [PMID: 23453261 DOI: 10.1016/j.drugalcdep.2013.01.020]
16 Pennington JD. The Copts in Modern Egypt. *Middle Eastern Stud* 1982; **18**(2): 158-179 [PMID: ISI:A1982NJ59100002]
17 Bishara A. Is there a 'Coptic question' in Egypt? Beirut, Lebanon: The Arab Center for Research and Policy Studies, 2011
18 Sedra P. Class cleavages and ethnic conflict: Coptic Christian communities in modern Egyptian politics. *Islam and Christian–Muslim Relations* 1999; **10**(2): 219-235 [DOI: 10.1080/09596419908721181]
19 Goldscheider C, Uhlenberg PR. Minority Group Status and Fertility. *American Journal of Sociology* 1969; **74**(4): 361-372 [DOI: 10.2307/2776057]
20 Goldscheider C. Population, Modernization and Social Structure. Boston: Little, Brown, 1971
21 Sly DF. Minority-Group Status and Fertility: An Extension of Goldscheider and Uhlenberg. *American Journal of Sociology* 1970; **76**(3): 443-459 [DOI: 10.2307/2775732]
22 Saleh M. On the road to heaven: self-selection, religion, and socioeconomic outcomes. Toulouse School of Economics (TSE) and Institute for Advanced Study in Toulouse (IAST), 2012.

~~Assessing the~~The potential for HIV parenteral transmission in the Middle East and North Africa: An analysis using hepatitis C virus as a proxy biomarker

批注 [a1]: Title should be less than 12 words.

Running head: Potential for HIV parenteral transmission in MENA

Yousra A. ~~Mohamoud~~[1]Mohamoud, F. DeWolfe ~~Miller~~[2]Miller and Laith J. Abu-Raddad[1, 3, 4]

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批注 [a2]: Author names should be given first, then the complete name of institution, city, province and postcode.

Author contributions: YAM and LJA conducted the literature review and data retrieval. YAM conducted analysis and wrote the first draft of the paper. FDM contributed to the analysis and drafting of the article. LJA conceived and led the design of the study, analysis, and drafting of the article. All authors contributed to discussion of the results and writing of the manuscript.

~~**Author contributions:**~~

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批注 [a3]: The format of this section should be like this:
Author contributions: Wang CL and Liang L contributed equally to this work; Wang CL, Liang L, Fu JF, Zou CC, Hong F and Wu XM designed research; Wang CL, Zou CC, Hong F and Wu XM performed research; Xue Jz and Lu JR contributed new reagents/analytic tools; Wang CL, Liang L and Fu JF analyzed data; and Wang CL, Liang L and Fu JF wrote the paper.

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Abstract

The Middle East and North Africa (MENA) region has endured several major events of parenteral transmission. Recent work has established the utility of using hepatitis C virus (HCV) as a proxy biomarker for assessing the epidemic potential for HIV parenteral transmission. In this review, we use ~~HCV~~data on the prevalence ~~data~~of HCV infection antibody (seroprevalence) among general population and high risk population groups to assess the potential for HIV parenteral transmission in MENA. Relatively low ~~HCV~~ prevalence of HCV infection in the general population groups was reported in most MENA countries indicating that parenteral HIV transmission at endemic levels does not appear to be a cause for concern. Nonetheless, there could be opportunities for localized HIV outbreaks and transmission of other blood-borne infections in some settings such as healthcare facilities. Though there have been steady improvements in safety measures related to parenteral modes of transmission in the region, these improvements have not been uniform across all countries. More precautions, including infection control training programs, surveillance systems for nosocomial infections and wider coverage and evaluation of hepatitis B virus immunization programs need to be implemented to avoid the unnecessary spread of HIV, HCV, and other blood-borne pathogens along the parenteral modes of transmission.

~~**Key words:**~~

~~**Core tip:**~~

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批注 [a4]: Please list 5–10 key words for each paper, selected mainly from Index Medicus, which reflect the content of the study. Each key word is separated by a semicolon.

批注 [a5]: Please write a summary of less than 100 words to outline the most innovative and important arguments and core contents in your paper to attract readers.

Key words: Hepatitis C virus; HIV; parenteral transmission; Middle East and North Africa; proxy biomarker

Core tip: The Middle East and North Africa (MENA) region has witnessed several major events of infection parenteral transmission. Recent studies of hepatitis C virus (HCV) epidemiology established the utility of using HCV as a proxy biomarker for assessing the potential for human immunodeficiency virus (HIV) parenteral transmission. Building on these novel ideas, we used HCV antibody prevalence data to assess the potential for substantial and/or sustainable HIV parenteral transmission in MENA. We found that HCV prevalence levels are consistent with limited potential for parenteral HIV transmission, but that there could be still opportunities for localized and isolated HIV outbreaks, particularly in formal and informal healthcare settings.

Introduction

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The Middle East and North Africa (MENA) region has endured several major events of parenteral transmission of infectious diseases. These include the world's largest iatrogenic transmission of a blood-borne pathogen; the hepatitis C virus (HCV) epidemic in Egypt during the era of parenteral antischistosomal therapy (PAT)[1], and two ~~HIV~~human immunodeficiency virus (HIV) outbreaks in renal dialysis centers also in Egypt[2, 3]. The region has also witnessed the largest documented nosocomial outbreak in HIV~~/AIDS~~ and acquired immune deficiency syndrome (AIDS) history which occurred in a children's hospital in Libya and involved 402 children, 19 mothers (through breast feeding), and two nurses[4-6].

Parenteral transmission of blood-borne pathogens has been documented to occur, particularly in resource-limited settings including different MENA countries[7, 8]. A few countries in this region such as Afghanistan, Pakistan, Somalia and Yemen, still lack the resources necessary to screen all blood donations and to sterilize medical equipment[9-15]. Public health systems in these countries are over-stretched leading to some lapses in safety measures[16]. Standard precautions are not routinely implemented in public and

even less so in private practices such as among dentists[17, 18], and in hemodialysis centers[19].

MENA also suffers from a high prevalence of unnecessary medical injections, unnecessary transfusions, reuse of needles and syringes, and scarifications[6, 10, 11, 16, 20-24]. At 4.3 per year, this region has the highest rate of injections per person per year of all regions[25]. Injections are the preferred mode of therapy even when alternative modes are equally effective and available[26, 27]. Blood transfusions are performed sometimes even without being medically indicated[28]. A considerable fraction of the population reports such procedures, between 6.7 to 14.2% of diverse population groups in Sudan reported having blood transfusion at least once in their lifetime[29-39].

HCV, first identified in 1989, is a blood-borne viral infection[40, 41]. It is primarily transmitted through direct percutaneous exposures to blood such as blood transfusions, sharing of needles, and accidental percutaneous occupational exposures[42]. HCV is a major cause of chronic liver disease and hepatocellular carcinoma[43], and is the most prevalent transfusion-transmitted infection[44]. It is estimated that 130-170 million people worldwide are infected with HCV[45, 46][46].

Both HIV and HCV are transmitted easily through infected needles[47]. Evidence from needle-stick injury studies suggest that the injection-related transmission probability for HCV is up to 10 times greater than that for HIV[47, 48]. Building on this, recent work has established the utility of using HCV antibody prevalence (seroprevalence) as a powerful proxy biomarker for the potential spread of HIV through the parenteral modes of transmission[49-54]. Study findings show, for example, that among a population of people who inject drugs (PWID) if HCV prevalence was less than 30%, then HIV prevalence is likely to be negligible[52-54]. However, if HCV prevalence is greater than 30%, then HIV prevalence would increase progressively with increasing HCV prevalence[52-54]. Accordingly, based on the epidemiological overlap between these two infections, HCV prevalence can inform the potential for HIV parenteral transmission in a population, and predict the size of a potential HIV epidemic. HCV in this regards is a better proxy

of parenteral transmissions than hepatitis B virus (HBV) which has other non-parenteral major modes of transmission[55].

Given the history of major events of parenteral transmission of blood-borne pathogens in MENA, and the emerging HIV epidemics among high risk groups[56-58], questions have risen as to whether there is ongoing parenteral HIV transmission in MENA beyond PWID, and whether such transmission explains a fraction of HIV acquisitions where there are no apparent identifiable risk behaviors[59]. To address these questions, given limitations on HIV data, we conducted a review of HCV prevalence among general population and high risk population groups in MENA to assess the potential for HIV parenteral transmission in the region.

This review draws on findings from the MENA HIV/AIDS Synthesis Project, the largest HIV study in MENA to date[58, 59]. The project consists of a compilation, synthesis, and analysis of available data on HIV, sexually transmitted infections (STIs), and sexual risk behavior across different population groups and the various countries in MENA[59]. In this review we summarize one aspect of the HIV/AIDS Synthesis project, which is the effort examining the potential for major HIV parenteral transmission in this region.

HCV prevalence and HIV transmission potential in general population groups in MENA

Table 1 summarizes the outcome of our review of HCV prevalence among general population groups. On the whole, low to intermediate levels of HCV prevalence are found among general population groups in most MENA countries. HCV prevalence among blood donors in Afghanistan ranges between 0.3% and 1.9% and between 0.1% and 2.1% in Iran. The prevalence among pregnant women is less than 1% in most MENA countries. These levels are not dissimilar to those found in the Americas, Asia, and Europe[60]. These rather low levels imply that there is a low risk for HIV parenteral transmission among general population groups in the region.

Despite the rather low HCV prevalence levels observed in most countries, MENA as a whole appears to have the highest HCV prevalence worldwide[61]. This is largely due to the contribution of the high prevalence found in heavily affected countries specifically

Egypt[62, 63] and Pakistan[64-67]. The Demographic and Health Survey conducted in Egypt in 2008 estimated a prevalence of 14.7% among individuals 15-59 years[62]. This high level is believed to be a consequence, at least in part, of the world's largest documented iatrogenic transmission of blood-borne pathogens during the era of PAT mass campaigns in Egypt[1, 68]. From the 1950s to the early 1980s, the Egyptian Ministry of Health led large-scale campaigns to control schistosomiasis[68]. Millions of people were treated with intravenous injections of tartar emetic, before an oral drug replaced this standard of care across the country in the 1980s[69]. Reuse of glass syringes and lax sterilization practices during PAT campaigns appear to have caused widespread infection with HCV, such that Egypt today has the world's highest HCV prevalence[42, 4646, 61, 63].

Pakistan appears to also suffer from a high HCV prevalence. A recent meta-analysis pooling 132 studies found HCV prevalence of 3% among blood donors and 4.7% among the general population in Pakistan[64]. Although the reasons behind the high HCV levels in this country remain not well understood, several studies investigated the risk factors associated with HCV infection. Nosocomial exposures including reuse of needles, medical procedures and blood transfusions were reported to be strongly associated with HCV infection in this country[70]. Additionally, community exposures through razor sharing and circumcision by barbers were also identified as risk factors[70]. The high HCV levels and parenteral exposures identified in both Egypt and Pakistan may suggest a potential for some marginal parenteral HIV transmission in these countries.

Parenteral HCV transmission among general population groups in the region appears to be ongoing though largely at low levels. This is highlighted, for example, in studies conducted among children. HCV prevalence among children in Saudi Arabia ranged from 0.1 to 1.8%[71-73] and as high as 1.5% in Somalia[74, 75] and 2.1% in Pakistan[76, 77]. Studies in Egypt suggest that in addition to vertical transmission, children could have been exposed to HCV horizontally, possibly through household exposures[78-82]. Medical exposures to HCV at a very young age have been also indicated[83-86]. HCV prevalence levels, however, are too low to be indicative of sustainable HIV parenteral

transmission, as they are much smaller than the ~30% HCV prevalence threshold indicative of considerable potential for HIV parenteral transmission[52].

HCV prevalence and HIV transmission potential in high risk groups in MENA

There are specific populations at higher risk for HCV and HIV parenteral transmission in MENA. Table 2 summarizes the outcome of our review of HCV prevalence among different populations at higher risk of HCV infection. High HCV prevalence is found among hospitalized and clinical populations, which have experienced various facility-based medical procedures such as hemodialysis patients and multi-transfused patients. A recent study in Algeria found HCV prevalence of 30% among hemophiliacs[87]. Incidence studies conducted in Tunisia and Morocco estimate fairly high incidence rates for HCV infection among dialysis patients (2.76 and 9.41 per 100 person-years, respectively)[88, 89]. Multiple studies in the region have found strong correlations between HCV infection and different medical procedures, perinatal care, and dental treatment[90-98]. Accordingly, exposures in medical care settings could constitute potential avenues for HIV parenteral transmission.

HIV prevalence has been measured and documented among a number of these high risk populations in several MENA countries. Table 3 lists these HIV prevalence measures. High HIV prevalence of 38.5% was reported among children with thalassemia in Qatar. Similarly, HIV prevalence of 4.8% was reported among blood or blood products recipients in Egypt. These studies with high HIV prevalence, however, tend to be old studies, published in the early 1990s, reflecting infections that occurred mainly before improvements in safety precautions and before implementation of stringent blood screening protocols. Meanwhile, the nil prevalence reported in more recent studies conducted in Iran, Jordan, Lebanon and Morocco reflects cross sectional surveys after safety precautions and stringent blood screening have been implemented widely in this region.

Individuals in certain professions could be at higher risk of being infected, or transmitting blood-borne infections, due to exposures to bodily fluids. Occupational injuries among healthcare workers (HCWs) are common in the region. In Morocco,

occupational injuries were found to be at high frequency, though they were found to be rarely declared[22, 99]. Forty-nine percent of HCWs in Egypt[19], 58.9% in Morocco[99], and 45% in Pakistan[16], reported a needle stick injury in the previous year[16]. Another such professional category are barbers, who seem to have a five-fold higher HCV prevalence than the general population (5% in Morocco[~~100~~][100] and 2.8% in Turkey[101]). Acquiring HCV infection at barber shops has been reported in Pakistan[65, 77, 102]. Studies among traditional barbers in Morocco and Pakistan have shown that the risk of blood-borne infections was not known to barbers nor to their customers and that hygiene conditions were deficient[~~100~~100, 103]. This poses a concern with a tradition in MENA of barbers practicing medicine[~~100~~][100].

Prisoners constitute another group at higher risk of HCV infection and transmission in the region. HCV prevalence of 31.4% was reported among prisoners in Egypt[104], while the prevalence ranged from 30%[105] to as high as 78%[106] among prisoners in Iran. This high prevalence suggests that injecting drug use and sharing of injecting and non-injecting utensils is common in prisons.

Some parenteral transmission of HCV in medical settings appears to be ongoing in MENA. This is evidenced by the high HCV prevalence levels reported among thalassemic children and children on hemodialysis. A recent study conducted in 2010, among 692 Egyptian diabetic children with an average age of 10.4 years, reported a prevalence of 2.5%[86]. Similarly, another study in Saudi Arabia reported a prevalence of 11% among children with cancer undergoing chemotherapy[71].

Discussion

Given the rather low prevalence of HCV in general population groups in most MENA countries, parenteral HIV transmission at endemic levels does not appear to be a cause for concern. The only possible exceptions are Egypt and Pakistan where higher levels of HCV parenteral transmission appear to be ongoing. However, HCV prevalence in these two countries is still well below the threshold level of 30%, and thus is not sufficient for sustainable parenteral HIV transmission.

Nonetheless, isolated HIV outbreaks in these two countries and in other countries in the region, particularly in healthcare facilities, could still occur as they have occurred in the past. The largest ever HIV/AIDS nosocomial outbreak occurred in a children's hospital in Libya[4-6]. The first ever documented HIV outbreak in renal dialysis centers occurred in Egypt[2], which later witnessed a second HIV outbreak in another renal dialysis center[3]. More recently, a high HIV prevalence of 35.8% was found in a survey of the general population in Gujarat, Pakistan, and apparently it may reflect an HIV parenteral-transmission outbreak related to medical care procedures[107].

While HCV genotype 4 is the most prevalent in Egypt[108], HCV genotype distribution varies between countries and within countries in the rest of the MENA region[108]. Different HCV genotypes may have different transmission probabilities or natural history. This suggests that our ability to use HCV prevalence as a proxy for potential HIV parenteral transmission may be dependent on which genotype is prevalent in MENA countries. However, as demonstrated by Vickerman *et al*, potential differences in the transmission probability or natural history of the different genotypes do not appear to affect the utility of HCV prevalence as a proxy biomarker of HIV parenteral transmission[49-54].

While there is a very limited risk for sustainable HIV transmission, there remains a concern for other blood-borne and nosocomial infections. MENA has the highest levels of all regions in the proportion of incident HBV (58.3%) and HCV infections (81.7%) that ~~is~~are attributable to contaminated injections[25]. ~~In Kuwait, hospital acquired infections occurred in 5.1% of all inpatients costing its national healthcare system $267,000 daily~~[108].Every year in MENA, contaminated injections appear to be the cause of 2.5 million HBV infections, 645,000 HCV infections, and 2,200 HIV infections[25]. In Kuwait, hospital acquired infections occurred in 5.1% of all inpatients costing its national healthcare system an estimate of $267,000 daily[109]. More recently, in Saudi Arabia, 8.5% of admitted patients developed nosocomial infections with the rates being highest for nursery (35.8%), intensive care (19.8%), gynecological (16.2%) and surgical (11.7%) patients[~~109~~110].

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There have been steady improvements in recent years in MENA in infection control and safety measures related to parenteral modes of infection transmission, with only a few countries still lagging in achieving satisfactory standards. HCV prevalence is a proxy for the cumulative risk of parenteral exposures over an extended period of time and thus may not be representative of more recent trends. Improvements in blood safety measures have apparently reduced HIV infections due to contaminated blood in the region from 12.1% of all infections in 1993 to 0.4% in 2003[110].[111]. In Lebanon and Palestine, no new HIV cases through blood transfusion have been detected for several years[111, 112].[112, 113]. In Iran, HCV prevalence among thalassemia patients decreased from 22.8% to 2.6% following the implementation of blood donor screening[113][114]. Also in Iran, HCV prevalence among hemodialysis patients decreased from 18% in 2001 to 12% in 2006 in one study[114], and from 14.4% in 1999 to 4.5% in 2006 in another study[115]. Similar reductions were also achieved for HBV in both Iran and Turkey. Also in Iran, HCV prevalence among hemodialysis patients decreased from 18% in 2001 to 12% in 2006 in one study[115], and from 14.4% in 1999 to 4.5% in 2006 in another study[116]. Similar reductions were also achieved for HBV in both Iran and Turkey[44, 115116, 116117]. HBV prevalence in Iran decreased from 3.4-3.5% in 1979-80 to 0.61% in 2005-06[44]. Similary in Turkey, HBV prevalence among blood donors fell from 5.98% in 1987 to 2.07% in 2003[116]. In Egypt, 95% of women in the 2005 Demographic and Health Survey reported that the medical provider followed basic injection safety procedures[117].[118]. However, these improvements may have not been uniform across MENA. A study in Pakistan suggested an increase in HCV prevalence in recent years[118].[119]. There is evidence of ongoing HCV incidence at dental and medical facilities[92-95], and at the household and population levels in Egypt[119-122][120-123]. There appears to be intrafamilial and household clustering of HCV infection in Pakistan[123].[124]. Talaat *et al* reported on an assessment survey of infection control practices conducted in a random selection of healthcare facilities in Egypt[108][109]. The survey revealed poor concept of infection control in most healthcare settings[108][109]. Infection control guidelines were not available, efforts to prevent transmission of nosocomial infections were deficient, and

there was a shortage of critical basic supplies such as antiseptics, gloves, masks, gowns and disposable syringes[~~108~~109].

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There is room for improvement in infection control and safety measures in healthcare settings in MENA. These improvements should be grounded on training and capacity building of infection control staff, the regular monitoring and supervision of infection control programs in healthcare facilities, and the establishment of surveillance systems for hospital acquired infections[~~108, 124~~][109, 125]. Additionally, the availability of critical supplies and equipment such as disinfectants and protective barriers is often challenging in settings with limited resources, and need to be improved[~~108, 124~~][109, 125]. Budgetary allocations and efficient advanced ordering are necessary to overcome these challenges. Finally, the promotion of occupational safety and health among HCWs is critical to reduce the incidence of unsafe practices and needle stick injuries among this population. This is key as healthcare facilities constitute the main settings of exposure to blood-borne infections.

Conclusion

Some HIV transmission may be present along the same pathways that HCV is using to spread in MENA. However, the parenteral modes of HIV transmission in the region, other than injecting drug use, are not of a scale that can sustain an HIV epidemic. Isolated HIV outbreaks though could still occur in some MENA countries as they have occurred in the past. Despite the steady improvements in infection control and safety measures, there are continued exposures to blood and bodily fluids in MENA countries which poses a concern for the transmission of other blood-borne infections. More precautions, including infection-control training and capacity building, monitoring and supervision of infection control programs, surveillance systems for nosocomial infections, availability of infection control supplies and equipment, in addition to more coverage and evaluation of HBV immunization programs, need to be implemented to avoid the unnecessary spread of HCV, HIV and other blood-borne pathogens along the parenteral modes of transmission.

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~~AUTHOR'S CONTRIBUTIONS~~

~~YAM and LJA conducted the literature review and data retrieval. YAM conducted analysis and wrote the first draft of the paper. FDM contributed to the analysis and drafting of the article. LJA conceived and led the design of the study, analysis, and drafting of the article. All authors contributed to discussion of the results and writing of the manuscript.~~

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COMPETING INTERESTS

The authors declare that they have no competing interests.

References

1 Frank C, Mohamed MK, Strickland GT, Lavanchy D, Arthur RR, Magder LS, El Khoby T, Abdel-Wahab Y, Aly Ohn ES, Anwar W, Sallam I. The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt. Lancet 2000; 355(9207): 887-891 [PMID: 10752705] DOI: http://dx.doi.org/10.1016/S0140-6736(99)06527-7]

2 Hassan NF, el Ghorab NM, Abdel Rehim MS, el Sharkawy MS, el Sayed NM, Emara K, Soltant Y, Sanad M, Hibbs RG, Arthur RR. HIV infection in renal dialysis patients in Egypt. Aids 1994; 8(6): 853 [PMID: 8086148 DOI: http://dx.doi.org/10.1097/00002030-199406000-00023]

3 El Sayed NM, Gomatos PJ, Beck-Sague CM, Dietrich U, von Briesen H, Osmanov S, Esparza J, Arthur RR, Wahdan MH, Jarvis WR. Epidemic transmission of human immunodeficiency virus in renal dialysis centers in Egypt. J Infect Dis 2000; 181(1): 91-97 [PMID: 10608755] DOI: http://dx.doi.org/10.1086/315167]

4 Visco-Comandini U, Cappiello G, Liuzzi G, Tozzi V, Anzidei G, Abbate I, Amendola A, Bordi L, Budabbus MA, Eljhawi OA, Mehabresh MI, Girardi E, Antinori A, Capobianchi MR, Sonnerborg A, Ippolito G. Monophyletic HIV type 1 CRF02-AG in a nosocomial outbreak in Benghazi, Libya. AIDS Res Hum Retroviruses 2002; 18(10): 727-732 [PMID: 12167281] DOI: http://dx.doi.org/10.1089/088922202760072366]

5 de Oliveira T, Pybus OG, Rambaut A, Salemi M, Cassol S, Ciccozzi M, Rezza G, Gattinara GC, D'Arrigo R, Amicosante M, Perrin L, Colizzi V, Perno CF. Molecular epidemiology: HIV-1 and HCV sequences from Libyan outbreak. *Nature* 2006; **444**(7121): 836-837 [PMID: 17171825] DOI: http://dx.doi.org/10.1038/444836a]

6 Yerly S, Quadri R, Negro F, Barbe KP, Cheseaux JJ, Burgisser P, Siegrist CA, Perrin L. Nosocomial outbreak of multiple bloodborne viral infections. *J Infect Dis* 2001; **184**(3): 369-372 [PMID: 11443566] DOI: http://dx.doi.org/10.1086/322036]

7 Kane A, Lloyd J, Zaffran M, Simonsen L, Kane M. Transmission of hepatitis B, hepatitis C and human immunodeficiency viruses through unsafe injections in the developing world: model-based regional estimates. *Bull World Health Organ* 1999; **77**(10): 801-807 [PMID: 10593027]

8 Simonsen L, Kane A, Lloyd J, Zaffran M, Kane M. Unsafe injections in the developing world and transmission of bloodborne pathogens: a review. *Bull World Health Organ* 1999; **77**(10): 789-800 [PMID: 10593026]

9 WHO/EMRO. Progress Report on HIV/AIDS and '3 by 5'. WHO. Cairo. July 2005. 2005

10 Khawaja ZA, Gibney L, Ahmed AJ, Vermund SH. HIV/AIDS and its risk factors in Pakistan. *Aids* 1997; **11**(7): 843-848 [PMID: 9189208] DOI: http://dx.doi.org/10.1097/00002030-199707000-00002]

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11 World Bank Group. World Bank Update 2005: HIV/AIDS in Pakistan. ~~2005~~ 2005 [availableonline: http://siteresources.worldbank.org/INTPAKISTAN/Resources/HIV-AIDS-brief-June2005-PK.pdf]

12 World Bank. HIV/AIDS in Afghanistan. 2006 [available online: http://www.aidsdatahub.org/sites/default/files/documents/Afghanistan_2006_HIV_AIDS_brief_World_Bank.pdf.pdf]

13 UNAIDS. Country alignment and harmonisation support to scaling up the HIV/AIDS resposne: the Somali Experience. 2006

14 WHO/EMRO. Progress Towards Universal Access to HIV Prevention, Treatment and Care in the Health Sector. Report on a baseline survey for the year 2005 in the WHO Eastern Mediterranean Region. Draft. 2006

15 Luby S, Khanani R, Zia M, Vellani Z, Ali M, Qureshi AH, Khan AJ, Abdul Mujeeb S, Shah SA, Fisher-Hoch S. Evaluation of blood bank practices in Karachi, Pakistan, and the government's response. *Health Policy Plan* 2000; **15**(2): 217-222 [PMID: 10837045] DOI: http://dx.doi.org/10.1093/heapol/15.2.217]

16 Zafar A, Aslam N, Nasir N, Meraj R, Mehraj V. Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan. *J Pak Med Assoc* 2008; **58**(2): 57-60 [PMID: 18333520]

17 Askarian M, Mirzaei K, McLaws ML. Attitudes, beliefs, and infection control practices of Iranian dentists associated with HIV-positive patients. *Am J Infect Control* 2006; **34**(8): 530-533 [PMID: 17015160] DOI: http://dx.doi.org/10.1016/j.ajic.2006.03.006]

18 Askarian M, Mirzaei K, Cookson B. Knowledge, attitudes, and practice of iranian dentists with regard to HIV-related disease. *Infect Control Hosp Epidemiol* 2007; **28**(1): 83-87 [PMID: 17230393] DOI: http://dx.doi.org/10.1086/509851]

19 Kabbash IA, El-Sayed NM, Al-Nawawy AN, Abou Salem Mel S, El-Deek B, Hassan NM. Risk perception and precautions taken by health care workers for HIV infection in haemodialysis units in Egypt. *East Mediterr Health J* 2007; **13**(2): 392-407 [PMID: 17684860]

20 Khattab HAS, Gineidy MA, Shorbagui N, Elnahal N. Report on a study of women living with HIV in Egypt. Egyptian Society for Population Studies and Reproductive Health. 2007

21 Burans JP, McCarthy M, el Tayeb SM, el Tigani A, George J, Abu-Elyazeed R, Woody JN. Serosurvey of prevalence of human immunodeficiency virus amongst high risk groups in Port Sudan, Sudan. *East Afr Med J* 1990; **67**(9): 650-655 [PMID: 2253574]

22 Hossini CH, Tripodi D, Rahhali AE, Bichara M, Betito D, Curtes JP, Verger C. [Knowledge and attitudes of health care professionals with respect to AIDS and the risk of occupational transmission of HIV in 2 Moroccan hospitals]. *Sante* 2000; **10**(5): 315-321 [PMID: 11125337]

23 Yemen Ministry of Health. National Strategic Framework for the Control and Prevention of HIV/AIDS in the Republic of Yemen. unknown

24 Kennedy M, O'Reilly D, Mah MW. The use of a quality-improvement approach to reduce needlestick injuries in a Saudi Arabian hospital. *Clin Perform Qual Health Care* 1998; **6**(2): 79-83 [PMID: 10180126]

25 Hauri AM, Armstrong GL, Hutin YJ. The global burden of disease attributable to contaminated injections given in health care settings. *Int J STD AIDS* 2004; **15**(1): 7-16 [PMID: 14769164 DOI: 10.1258/095646204322637182]

26 Janjua NZ, Hutin YJ, Akhtar S, Ahmad K. Population beliefs about the efficacy of injections in Pakistan's Sindh province. *Public Health* 2006; **120**(9): 824-833 [PMID: 16876212 DOI: S0033-3506(06)00126-0 [pii]

10.1016/j.puhe.2006.05.004]

27 Altaf A, Fatmi Z, Ajmal A, Hussain T, Qahir H, Agboatwalla M. Determinants of therapeutic injection overuse among communities in Sindh, Pakistan. *J Ayub Med Coll Abbottabad* 2004; **16**(3): 35-38 [PMID: 15631369]

28 Abdul Mujeeb S. Blood transfusion – a potential source of HIV/AIDS spread. *J Pakistan Med Assoc* 1993; **43**: 1

29 Ahmed SM. University Students. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

30 Ahmed SM. Truck Drivers. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

31 Ahmed SM. Tea Sellers. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

32 Ahmed SM. TB Patients. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

33 Ahmed SM. Street Children. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

34 Ahmed SM. STDs. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

35 Ahmed SM. Sex Sellers. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

36 Ahmed SM. Military. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

37 Ahmed SM. Internally Displaced People. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

38 Ahmed SM. Antenatal. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

39 Ahmed SM. AIDS Patients. Situation Analysis-Behavioral Survey. Results & Discussions. Report. Sudan National AIDS Control Program. 2004

40 Miller FD, Abu-Raddad LJ. Evidence of intense ongoing endemic transmission of hepatitis C virus in Egypt. *Proc Natl Acad Sci U S A* 2010; **107**(33): 14757-14762 [PMID: 20696911 PMCID: 2930444 DOI: 1008877107 [pii]

10.1073/pnas.1008877107]

41 Choo Q, Kuo G, Weiner A, Overby L, Bradley D, Houghton M. Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. *Science* 1989; **244**(4902): 359-362 [DOI: 10.1126/science.2523562]

42 Alter MJ. Epidemiology of hepatitis C virus infection. *World J Gastroenterol* 2007; **13**(17): 2436-2441 [PMID: 17552026 DOI:10.3748/wjg.v19.i40.6703]

43 Colombo M, Rumi MG, Ninno ED. Treatment of chronic hepatitis C in Europe. *J Hepatobiliary Pancreat Surg* 2003; **10**(2): 168-171 [PMID: 14505151 DOI: 10.1007/s00534-002-0728-4]

44 Rezvan H, Abolghassemi H, Kafiabad SA. Transfusion-transmitted infections among multitransfused patients in Iran: a review. *Transfus Med* 2007; **17**(6): 425-433 [PMID: 18067646] DOI: http://dx.doi.org/10.1111/j.1365-3148.2007.00794.x]

45 Blower SM, Dowlatabadi H. Sensitivity and Uncertainty Analysis of Complex Models of Disease Transmission: An HIV Model, as an Example. *International Statistical Review / Revue Internationale de Statistique* 1994; **62**(2): 229-243 [DOI: http://dx.doi.org/10.2307/1403510]

46 Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. *The Lancet infectious diseases* 2005; **5**(9): 558-567 [PMID: 16122679 DOI: 10.1016/S1473-3099(05)70216-4]

47 Baggaley RF, Boily MC, White RG, Alary M. Risk of HIV-1 transmission for parenteral exposure and blood transfusion: a systematic review and meta-analysis. *AIDS* 2006; **20**(6): 805-812 [PMID: 16549963 DOI: 10.1097/01.aids.0000218543.46963.6d]

48 Boily MC, Pickles M, Vickerman P, Buzdugan R, Isac S, Deering KN, Blanchard JF, Moses S, Lowndes CM, Ramesh BM, Demers E, Alary M. Using mathematical modelling to investigate the plausibility of attributing observed antenatal clinic declines to a female sex worker intervention in Karnataka state, India. *AIDS* 2008; **22 Suppl 5**: S149-164 [PMID: 19098475 DOI: 10.1097/01.aids.0000343773.59776.5b]

49 Goldmann DA. Blood-borne pathogens and nosocomial infections. *J Allergy Clin Immunol* 2002; **110**(2 Suppl): S21-26 [PMID: 12170239] DOI: http://dx.doi.org/10.1067/mai.2002.125337]

50 Walker PR, Worobey M, Rambaut A, Holmes EC, Pybus OG. Epidemiology: Sexual transmission of HIV in Africa. *Nature* 2003; **422**(6933): 679 [PMID: 12700750] DOI: http://dx.doi.org/10.1038/422679a]

51 Schmid GP, Buve A, Mugyenyi P, Garnett GP, Hayes RJ, Williams BG, Calleja JG, De Cock KM, Whitworth JA, Kapiga SH, Ghys PD, Hankins C, Zaba B, Heimer R, Boerma JT. Transmission of HIV-1 infection in sub-Saharan Africa and effect of elimination of unsafe injections. *Lancet* 2004; **363**(9407): 482-488 [PMID: 14962531] DOI: http://dx.doi.org/10.1016/S0140-6736(04)15497-4]

52 Vickerman P, Hickman M, May M, Kretzschmar M, Wiessing L. Can hepatitis C virus prevalence be used as a measure of injection-related human immunodeficiency virus risk in populations of injecting drug users? An ecological analysis. *Addiction* 2010; **105**(2): 311-318 [PMID: 19922515 DOI: 10.1111/j.1360-0443.2009.02759.x]

53 Vickerman P, Martin NK, Hickman M. Understanding the trends in HIV and hepatitis C prevalence amongst injecting drug users in different settings--implications for intervention impact. *Drug and alcohol dependence* 2012; **123**(1-3): 122-131 [PMID: 22138540 DOI: 10.1016/j.drugalcdep.2011.10.032]

54 Vickerman P, Martin NK, Roy A, Beattie T, Jarlais DD, Strathdee S, Wiessing L, Hickman M. Is the HCV-HIV co-infection prevalence amongst injecting drug users a marker for the level of sexual and injection related HIV transmission? *Drug and alcohol dependence* 2013; **132**(1-2): 172-181 [PMID: 23453261 DOI: 10.1016/j.drugalcdep.2013.01.020]

55 Maayan S, Shufman EN, Engelhard D, Shouval D. Exposure to hepatitis B and C and to HTLV-1 and 2 among Israeli drug abusers in Jerusalem. *Addiction (Abingdon, England)* 1994; **89**(7): 869-874 [PMID: 8081185] DOI: http://dx.doi.org/10.1111/j.1360-0443.1994.tb00990.x]

56 Mumtaz G, Hilmi N, McFarland W, Kaplan RL, Akala FA, Semini I, Riedner G, Tawil O, Wilson D, Abu-Raddad LJ. Are HIV epidemics among men who have sex with men emerging in the Middle East and North Africa?: a systematic review and data synthesis. *PLoS medicine* 2010; **8**(8): e1000444 [PMID: 21829329 PMCID: 3149074 DOI: 10.1371/journal.pmed.1000444]

57 Mumtaz G, Hilmi N, Akala FA, Semini I, Riedner G, Wilson D, Abu-Raddad LJ. HIV-1 molecular epidemiology evidence and transmission patterns in the Middle East and North Africa. *Sexually transmitted infections* 2011; **87**(2): 101-106 [PMID: 21036790 DOI: 10.1136/sti.2010.043711]

58 Abu-Raddad LJ, Hilmi N, Mumtaz G, Benkirane M, Akala FA, Riedner G, Tawil O, Wilson D. Epidemiology of HIV infection in the Middle East and North Africa. *AIDS* 2010; **24 Suppl 2**: S5-23 [PMID: 20610949 DOI: 10.1097/01.aids.0000386729.56683.33]

59 Abu-Raddad L, Akala FA, Semini I, Riedner G, Wilson D, Tawil O. Characterizing the HIV/AIDS epidemic in the Middle East and North Africa: Time for Strategic Action. Middle East and North Africa HIV/AIDS Epidemiology Synthesis Project. World Bank/UNAIDS/WHO Publication. Washington DC: The World Bank Press, 2010 [DOI: http://dx.doi.org/10.1596/978-0-8213-8137-3]

60 Sy T, Jamal MM. Epidemiology of hepatitis C virus (HCV) infection. *Int J Med Sci* 2006; **3**(2): 41-46 [PMID: 16614741] DOI: http://dx.doi.org/10.7150/ijms.3.41]

61 Lavanchy D. Evolving epidemiology of hepatitis C virus. *Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases* 2011; **17**(2): 107-115 [PMID: 21091831 DOI: 10.1111/j.1469-0691.2010.03432.x]

62 El-Zanaty F, Way A. Egypt Demographic and Health Survey 2008. Egyptian: Ministry of Health. Cairo: El-Zanaty and Associates, and Macro International, 2009 [available online at:https://www.measuredhs.com/pubs/pdf/FR220/FR220.pdf]

63 Mohamoud YA, Mumtaz GR, Riome S, Miller D, Abu-Raddad LJ. The epidemiology of hepatitis C virus in Egypt: a systematic review and data synthesis. *BMC infectious diseases* 2013; **13**: 288 [PMID: 23799878 PMCID: 3702438 DOI: 10.1186/1471-2334-13-288]

64 Umar M, Bushra HT, Ahmad M, Data A, Khurram M, Usman S, Arif M, Adam T, Minhas Z, Arif A, Naeem A, Ejaz K, Butt Z, Bilal M. Hepatitis C in Pakistan: a review of available data. *Hepatitis monthly* 2010; **10**(3): 205-214 [PMID: 22308140 PMCID: 3269085]

65 Raja NS, Janjua KA. Epidemiology of hepatitis C virus infection in Pakistan. *J Microbiol Immunol Infect* 2008; **41**(1): 4-8 [PMID: 18327420]

66 Khokhar N, Gill ML, Malik GJ. General seroprevalence of hepatitis C and hepatitis B virus infections in population. *J Coll Physicians Surg Pak* 2004; **14**(9): 534-536 [PMID: 15353136]

67 Aslam M, Aslam J, Mitchell BD, Munir KM. Association between smallpox vaccination and hepatitis C antibody positive serology in Pakistani volunteers. *Journal of clinical gastroenterology* 2005; **39**(3): 243-246 [PMID: 15718868] DOI: http://dx.doi.org/10.1097/01.mcg.0000153286.02694.14]

68 Strickland GT. Liver disease in Egypt: hepatitis C superseded schistosomiasis as a result of iatrogenic and biological factors. *Hepatology* 2006; **43**(5): 915-922 [PMID: 16628669 DOI: 10.1002/hep.21173]

69 Frank C, Mohamed MK, Strickland GT, Lavanchy D, Arthur RR, Magder LS, El Khoby T, Abdel-Wahab Y, Aly Ohn ES, Anwar W, Sallam I. The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt. *Lancet* 2000; **355**(9207): 887-891 [PMID: 2000092843 DOI: http://dx.doi.org/10.1016/S0140-6736%2899%2906527-7]

70 Idrees M, Riazuddin S. Frequency distribution of hepatitis C virus genotypes in different geographical regions of Pakistan and their possible routes of transmission. *BMC infectious diseases* 2008; **8**: 69 [PMID: 18498666 PMCID: 2409346 DOI: 10.1186/1471-2334-8-69]

71 Bakir TM, Kurbaan KM, al Fawaz I, Ramia S. Infection with hepatitis viruses (B and C) and human retroviruses (HTLV-1 and HIV) in Saudi children receiving cycled

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cancer chemotherapy. *J Trop Pediatr* 1995; **41**(4): 206-209 [PMID: 7563271] DOI: http://dx.doi.org/10.1093/tropej/41.4.206]

72 Al-Faleh FZ, Ayoola EA, Al-Jeffry M, Al-Rashed R, Al-Mofarreh M, Arif M, Ramia S, Al-Karawi M, Al-Shabrawy M. Prevalence of antibody to hepatitis C virus among Saudi Arabian children: a community-based study. *Hepatology* 1991; **14**(2): 215-218 [DOI: http://dx.doi.org/10.1002/hep.1840140202]

73 Shobokshi OA, Serebour FE, Al-Drees AZ, Mitwalli AH, Qahtani A, Skakni LI. Hepatitis C virus seroprevalence rate among Saudis. *Saudi Med J* 2003; **24 Suppl 2**: S81-86 [PMID: 12897907]

74 Aceti A, Taliani G, Bruni R, Sharif OS, Moallin KA, Celestino D, Quaranta G, Sebastiani A. Hepatitis C virus infection in chronic liver disease in Somalia. *Am J Trop Med Hyg* 1993; **48**(4): 581-584 [PMID: 7683179]

75 Bile K, Mohamud O, Aden C, Isse A, Norder H, Nilsson L, Magnius L. The risk for hepatitis A, B, and C at two institutions for children in Somalia with different socioeconomic conditions. *Am J Trop Med Hyg* 1992; **47**(3): 357-364 [PMID: 1524149]

76 Butt T, Amin MS. Seroprevalence of hepatitis B and C infections among young adult males in Pakistan. *East Mediterr Health J* 2008; **14**(4): 791-797 [PMID: 19166161]

77 Ali SA, Donahue RM, Qureshi H, Vermund SH. Hepatitis B and hepatitis C in Pakistan: prevalence and risk factors. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases* 2009; **13**(1): 9-19 [PMID: 18835208 PMCID: 2651958 DOI: 10.1016/j.ijid.2008.06.019]

78 Mohamed MK, Abdel-Hamid M, Mikhail NN, Abdel-Aziz F, Medhat A, Magder LS, Fix AD, Strickland GT. Intrafamilial transmission of hepatitis C in Egypt. *Hepatology* 2005; **42**(3): 683-687 [PMID: 2005397574 DOI: http://dx.doi.org/10.1002/hep.20811]

79 Plancoulaine S, Mohamed MK, Arafa N, Bakr I, Rekacewicz C, Tregouet DA, Obach D, El Daly M, Thiers V, Feray C, Abdel-Hamid M, Abel L, Fontanet A. Dissection of familial correlations in hepatitis C virus (HCV) seroprevalence suggests intrafamilial viral transmission and genetic predisposition to infection. *Gut* 2008; **57**(9): 1268-1274 [PMID: 18480169 DOI: 10.1136/gut.2007.140681]

80 Morad WS. Transmission of hepatitis C between spouses an epidemiological study at National Liver Institute hospital. *International Journal of Infectious Diseases* 2011; **15**: S81 [PMID: 70496706 DOI: http://dx.doi.org/10.1016/S1201-9712%2811%2960279-8]

81 Shebl FM, El-Kamary SS, Saleh DA, Abdel-Hamid M, Mikhail N, Allam A, El-Arabi H, Elhenawy I, El-Kafrawy S, El-Daly M, Selim S, El-Wahab AA, Mostafa M, Sharaf S, Hashem M, Heyward S, Stine OC, Magder LS, Stoszek S, Strickland GT. Prospective cohort study of mother-to-infant infection and clearance of hepatitis C in rural Egyptian villages. *Journal of medical virology* 2009; **81**(6): 1024-1031 [PMID: 19382251 PMCID: 3235472 DOI: 10.1002/jmv.21480]

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82 El-Zayadi A, Khalifa AA, El-Misiery A, Naser AM, Dabbous H, Aboul-Ezz AA. Evaluation of risk factors for intrafamilial transmission of HCV infection in Egypt. *The Journal of the Egyptian Public Health Association* 1997; **72**(1-2): 33-51 [PMID: 17265624]

83 Kandil ME, Rasheed MA, Saad NE. Hepatitis C and B viruses among some high risk groups of Egyptian children. *Journal of Medical Sciences* 2007; **7**(8): 1259-1267 [PMID: 2007615566] DOI: http://dx.doi.org/10.3923/jms.2007.1259.1267]

84 Hammad AM, Zaghloul MH. Hepatitis G virus infection in Egyptian children with chronic renal failure (single centre study). *Annals of clinical microbiology and antimicrobials* 2009; **8**: 36 [PMID: 20015406 DOI: http://dx.doi.org/10.1186/1476-0711-8-36]

85 elEl-Nanawy AA, elEl Azzouni OF, Soliman AT, Amer AE, Demian RS, elEl-Sayed HM. Prevalence of hepatitis-C antibody seropositivity in healthy Egyptian children and four high risk groups. *Journal of tropical pediatrics] Trop Pediatr* 1995; **41**(6): 341-343 [PMID: 8606441] DOI:http://dx.doi.org/10.1093/tropej/41.6.341]

86 El-Karaksy H, Anwar GH, El-Raziky MS, El-Hawary M, Hashem M, El-Sayed R, El-Shabrawi M, Mohsen N, Fouad H, Esmat G. Anti-HCV prevalence among diabetic and non-diabetic Egyptian children. *Current diabetes reviews* 2010; **6**(6): 388-392 [PMID: 20879976] DOI: http://dx.doi.org/10.2174/157339910793499137]

87 Saidane N, Saidi M, Derdous C, Rouabhia S, Soltani F, Ouarhlent Y. Various complications in haemophiliacs managed by Hospital University of Batna, Algeria. *Journal of Thrombosis and Haemostasis* 2011; **9**: 923 [PMID: 70615197 DOI: http://dx.doi.org/10.1111/j.1538-7836.2011.04380_4.x]

88 Ben Othman S, Bouzgarrou N, Achour A, Bourlet T, Pozzetto B, Trabelsi A. [High prevalence and incidence of hepatitis C virus infections among dialysis patients in the East-Centre of Tunisia]. *Pathol Biol (Paris)* 2004; **52**(6): 323-327 [PMID: 15261374 DOI: 10.1016/j.patbio.2003.07.001]

89 Sekkat S, Kamal N, Benali B, Fellah H, Amazian K, Bourquia A, El Kholti A, Benslimane A. Prevalence of anti-HCV antibodies and seroconversion incidence in five haemodialysis units in Morocco. [French]

Prevalence des anticorps anti-VHC et incidence de seroconversion dans cinq centres d'hemodialyse au Maroc. *Nephrologie et Therapeutique* 2008; **4**(2): 105-110 [PMID: 2008175807 DOI: http://dx.doi.org/10.1016/j.nephro.2007.11.007]

90 Saleh DA, Shebl F, Abdel-Hamid M, Narooz S, Mikhail N, El-Batanony M, El-Kafrawy S, El-Daly M, Sharaf S, Hashem M, El-Kamary S, Magder LS, Stoszek SK, Strickland GT. Incidence and risk factors for hepatitis C infection in a cohort of women in rural Egypt. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2008; **102**(9): 921-928 [PMID: 2008362335 DOI: http://dx.doi.org/10.1016/j.trstmh.2008.04.011]

带格式的：无下划线，字体颜色：自动设置

带格式的：无下划线，字体颜色：自动设置

91 Arafa N, El Hoseiny M, Rekacewicz C, Bakr I, El-Kafrawy S, El Daly M, Aoun S, Marzouk D, Mohamed MK, Fontanet A. Changing pattern of hepatitis C virus spread in rural areas of Egypt. *Journal of Hepatology* 2005; **43**(3): 418-424 [PMID: 2005357765 DOI: http://dx.doi.org/10.1016/j.jhep.2005.03.021]

92 el-Sadawy M, Ragab H, el-Toukhy H, el-Mor Ael L, Mangoud AM, Eissa MH, Afefy AF, el-Shorbagy E, Ibrahem IA, Mahrous S, Abdel-Monem A, Sabee EI, Ismail A, Morsy TA, Etewa S, Nor Edin E, Mostafa Y, Abouel-Magd Y, Hassan MI, Lakouz K, Abdel-Aziz K, el-Hady G, Saber M. Hepatitis C virus infection at Sharkia Governorate, Egypt: seroprevalence and associated risk factors. *Journal of the Egyptian Society of Parasitology* 2004; **34**(1 Suppl): 367-384 [PMID: 15124747]

93 Habib M, Mohamed MK, Abdel-Aziz F, Magder LS, Abdel-Hamid M, Gamil F, Madkour S, Mikhail NN, Anwar W, Strickland GT, Fix AD, Sallam I. Hepatitis C virus infection in a community in the Nile Delta: Risk factors for seropositivity. *Hepatology* 2001; **33**(1): 248-253 [PMID: 2001012228 DOI: http://dx.doi.org/10.1053/jhep.2001.20797]

94 Kalil KA, Farghally HS, Hassanein KM, Abd-Elsayed AA, Hassanein FE. Hepatitis C virus infection among paediatric patients attending University of Assiut Hospital, Egypt. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit* 2010; **16**(4): 356-361 [PMID: 20795415]

95 Barakat SH, El-Bashir N. Hepatitis C virus infection among healthy Egyptian children: Prevalence and risk factors. *Journal of Viral Hepatitis* 2011; **18**(11): 779-784 [PMID: 2011569676 DOI: http://dx.doi.org/10.1111/j.1365-2893.2010.01381.x]

96 Mohamed MK, Hussein MH, Massoud AA, Rakhaa MM, Shoeir S, Aoun AA, Aboul Naser M. Study of the risk factors for viral hepatitis C infection among Egyptians applying for work abroad. *The Journal of the Egyptian Public Health Association* 1996; **71**(1-2): 113-147 [PMID: 17217004]

97 Cacoub P, Ohayon V, Sekkat S, Dumont B, Sbai A, Lunel F, Benslimane A, Godeau P, Archane MI. Epidemiologic and virologic study of hepatitis C virus infections in Morocco. [French]

Etude epidemiologique et virologique des infections par le virus de l'hepatite C au Maroc. *Gastroenterologie clinique et biologique* 2000; **24**(2): 169-173 [PMID: 12687957]

98 Kutrani H, El-Gatit A, Shekhteryea A, El-Gitait Y, Sudani O, Akoub S. Demographic factors influencing hepatitis B and C infection in Benghazi, Libyan Arab Jamahiriya. [Arabic]. *Eastern Mediterranean Health Journal* 2007; **13**(1): 85-97 [PMID: 2007396465]

99 Laraqui O, Laraqui S, Tripodi D, Zahraoui M, Caubet A, Verger C, Laraqui CH. [Assessing knowledge, attitude, and practice on occupational blood exposure in

带格式的：无下划线，字体颜色：自动设置

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带格式的：无下划线，字体颜色：自动设置

带格式的：无下划线，字体颜色：自动设置

caregiving facilities, in Morocco]. *Med Mal Infect* 2008; **38**(12): 658-666 [PMID: 18954949 DOI: S0399-077X(08)00275-8 [pii]

10.1016/j.medmal.2008.09.009]

100 Zahraoui-Mehadji M, Baakrim MZ, Laraqui S, Laraqui O, El Kabouss Y, Verger C, Caubet A, Laraqui CH. [Infectious risks associated with blood exposure for traditional barbers and their customers in Morocco]. *Sante ~~(Montrouge, France)~~* 2004; **14**(4): 211-216 [PMID: 15745870]

101 Candan F, Alagozlu H, Poyraz O, Sumer H. Prevalence of hepatitis B and C virus infection in barbers in the Sivas region of Turkey. *Occup Med (Lond)* 2002; **52**(1): 31-34 [PMID: 11872792~~]~~ DOI: http://dx.doi.org/10.1093/occmed/52.1.31]

102 Khattak MN, Akhtar S, Mahmud S, Roshan TM. Factors influencing Hepatitis C virus sero-prevalence among blood donors in north west Pakistan. *J Public Health Policy* 2008; **29**(2): 207-225 [PMID: 18523475 DOI: jphp20087 [pii]

10.1057/jphp.2008.7]

103 Janjua NZ, Nizamy MA. Knowledge and practices of barbers about hepatitis B and C transmission in Rawalpindi and Islamabad. *J Pak Med Assoc* 2004; **54**(3): 116-119 [PMID: 15129868]

104 Quinti I, Renganathan E, El Ghazzawi E, Divizia M, Sawaf G, Awad S, Pana A, Rocchi G. Seroprevalence of HIV and HCV infections in Alexandria, Egypt. *Zentralbl Bakteriol* 1995; **283**(2): 239-244 [PMID: 8825115~~]~~ DOI: http://dx.doi.org/10.1016/S0934-8840(11)80205-7]

105 Alizadeh AH, Alavian SM, Jafari K, Yazdi N. Prevalence of hepatitis C virus infection and its related risk factors in drug abuser prisoners in Hamedan--Iran. *World J Gastroenterol* 2005; **11**(26): 4085-4089 [PMID: 15996035]

106 Nassirimanesh B. Proceedings of the abstract for the Fourth National Harm Reduction Conference, Seattle, USA. 2002

107 Ansari JA, Salman M, Safdar RM, Ikram N, Mahmood T, Zaheer HA, Walke H, Asghar RJ. HIV/AIDS outbreak investigation in Jalalpur Jattan (JPJ), Gujrat, Pakistan. *Journal of Epidemiology and Global Health* (0) [DOI: http://dx.doi.org/10.1016/j.jegh.2013.06.001]

~~108~~108 Ramia S, Eid-Fares J. Distribution of hepatitis C virus genotypes in the Middle East. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases* 2006; **10**(4): 272-277 [PMID: 16564719 DOI: 10.1016/j.ijid.2005.07.008]

109 Talaat M, Kandeel A, Rasslan O, Hajjeh R, Hallaj Z, El-Sayed N, Mahoney FJ. Evolution of infection control in Egypt: achievements and challenges. *American journal of infection control* 2006; **34**(4): 193-200 [PMID: 16679176 DOI: 10.1016/j.ajic.2005.05.028]

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带格式的：无下划线，字体颜色：自动设置

带格式的：行距：单倍行距

~~109~~110 Al-Ghamdi S, Gedebou M, Bilal NE. Nosocomial infections and misuse of antibiotics in a provincial community hospital, Saudi Arabia. *The Journal of hospital infection* 2002; **50**(2): 115-121 [PMID: 11846538 DOI: 10.1053/jhin.2001.1149]

~~110~~111 UNAIDS RST MENA. Notes on AIDS in the Middle East and North Africa. 2008

~~111~~112 Jurjus AR, Kahhaleh J, National AIDS Program, Organization-EMRO WH. Knowledge, Attitudes, Beliefs, and Practices of the Lebanese Concerning HIV/AIDS. Beirut, Lebanon. 2004

~~112~~113 UNAIDS. Key Findings on HIV Status in the West Bank and Gaza. Working Document. UNAIDS Regional Support Team For the Middle East and North Africa. 2007

~~113~~114 Mirmomen S, Alavian SM, Hajarizadeh B, Kafaee J, Yektaparast B, Zahedi MJ, Zand V, Azami AA, Hosseini MM, Faridi AR, Davari K, Hajibeigi B. Epidemiology of hepatitis B, hepatitis C, and human immunodeficiency virus infecions in patients with beta-thalassemia in Iran: a multicenter study. *Arch Iran Med* 2006; **9**(4): 319-323 [PMID: 17061602]

~~114~~115 Taziki O, Espahbodi F. Prevalence of hepatitis C virus infection in hemodialysis patients. *Saudi J Kidney Dis Transpl* 2008; **19**(3): 475-478 [PMID: 18445917]

~~115~~116 Alavian SM, Bagheri-Lankarani K, Mahdavi-Mazdeh M, Nourozi S. Hepatitis B and C in dialysis units in Iran: changing the epidemiology. *Hemodial Int* 2008; **12**(3): 378-382 [PMID: 18638096 DOI: HDI284 [pii]

10.1111/j.1542-4758.2008.00284.x]

~~116~~117 Kocak N, Hepgul S, Ozbayburtlu S, Altunay H, Ozsoy MF, Kosan E, Aksu Y, Yilmaz G, Pahsa A. Trends in major transfusion-transmissible infections among blood donors over 17 years in Istanbul, Turkey. *J Int Med Res* 2004; **32**(6): 671-675 [PMID: 15587762~~]~~ DOI: http://dx.doi.org/10.1177/147323000403200613]

~~117~~118 Measure DHS. Egypt: Demographic and Health Survey 2005. In: Africa MEaN, ed. Demographic and Health Surveys, 2006.

~~118~~119 Mujeeb SA, Pearce MS. Temporal trends in hepatitis B and C infection in family blood donors from interior Sindh, Pakistan. *BMC Infect Dis* 2008; **8**: 43 [PMID: 18402660 DOI: 1471-2334-8-43 [pii]

10.1186/1471-2334-8-43]

~~119~~120 Mohamed MK, Abdel-Hamid M, Mikhail NN, Abdel-Aziz F, Medhat A, Magder LS, Fix AD, Strickland GT. Intrafamilial transmission of hepatitis C in Egypt. *Hepatology* 2005; **42**(3): 683-687 [PMID: 16032698~~]~~ DOI: http://dx.doi.org/10.1002/hep.20811]

~~120~~121 Saleh DA, Shebl F, Abdel-Hamid M, Narooz S, Mikhail N, El-Batanony M, El-Kafrawy S, El-Daly M, Sharaf S, Hashem M, El-Kamary S, Magder LS, Stoszek SK,

Strickland GT. Incidence and risk factors for hepatitis C infection in a cohort of women in rural Egypt. *Trans R Soc Trop Med Hyg* 2008; **102**(9): 921-928 [PMID: 18514243 DOI: S0035-9203(08)00157-0 [pii]

10.1016/j.trstmh.2008.04.011]

~~121~~122 Mohamed MK, Magder LS, Abdel-Hamid M, El-Daly M, Mikhail NN, Abdel-Aziz F, Medhat A, Thiers V, Strickland GT. Transmission of hepatitis C virus between parents and children. *Am J Trop Med Hyg* 2006; **75**(1): 16-20 [PMID: 16837701 DOI: 75/1/16 [pii]]

~~122~~123 Magder LS, Fix AD, Mikhail NN, Mohamed MK, Abdel-Hamid M, Abdel-Aziz F, Medhat A, Strickland GT. Estimation of the risk of transmission of hepatitis C between spouses in Egypt based on seroprevalence data. *Int J Epidemiol* 2005; **34**(1): 160-165 [PMID: 15647312 DOI: dyh370 [pii]

10.1093/ije/dyh370]

~~123~~124 Abbas Z, Jeswani NL, Kakepoto GN, Islam M, Mehdi K, Jafri W. Prevalence and mode of spread of hepatitis B and C in rural Sindh, Pakistan. *Trop Gastroenterol* 2008; **29**(4): 210-216 [PMID: 19323090]

~~124~~125 Memish ZA. Infection control in Saudi Arabia: meeting the challenge. *American journal of infection control* 2002; **30**(1): 57-65 [PMID: 11852419~~]~~ DOI: http://dx.doi.org/10.1067/mic.2002.120905]

~~125~~126 Dupire B, Abawi AK, Ganteaume C, Lam T, Truze P, Martet G. Establishment of a blood transfusion center at Kabul (Afghanistan). *Sante* 1999; **9**(1): 18-22 [PMID: 10210798]

~~126~~127 Afghanistan Central Blood Bank. Report of Testing of Blood Donors from March – December, 2006. Ministry of Public Health, Kabul, Afghanistan. 2006

~~127~~128 Todd CS, Ahmadzai M, Atiqzai F, Miller S, Smith JM, Ghazanfar SA, Strathdee SA. Seroprevalence and correlates of HIV, syphilis, and hepatitis B and C virus among intrapartum patients in Kabul, Afghanistan. *BMC Infect Dis* 2008; **8**: 119 [PMID: 18798996 DOI: 1471-2334-8-119 [pii]

10.1186/1471-2334-8-119]

~~128~~129 Ayed Z, Houinato D, Hocine M, Ranger-Rogez S, Denis F. [Prevalence of serum markers of hepatitis B and C in blood donors and pregnant women in Algeria]. *Bull Soc Pathol Exot* 1995; **88**(5): 225-228 [PMID: 8646011]

~~129~~130 Aidaoui M, Bouzbid S, Laouar M. [Seroprevalence of HIV infection in pregnant women in the Annaba region (Algeria)]. *Rev Epidemiol Sante Publique* 2008; **56**(4): 261-266 [PMID: 18687541 DOI: S0398-7620(08)00611-1 [pii]

10.1016/j.respe.2008.05.023]

~~130~~131 Almawi WY, Qadi AA, Tamim H, Ameen G, Bu-Ali A, Arrayid S, Abou Jaoude MM. Seroprevalence of hepatitis C virus and hepatitis B virus among dialysis patients in Bahrain and Saudi Arabia. *Transplant Proc* 2004; **36**(6): 1824-1826 [PMID: 15350487~~]~~ DOI: http://dx.doi.org/10.1016/j.transproceed.2004.07.019]

~~131~~132 Dray X, Dray-Spira R, Bronstein JA, Mattera D. [Prevalences of HIV, hepatitis B and hepatitis C in blood donors in the Republic of Djibouti]. *Med Trop (Mars)* 2005; **65**(1): 39-42 [PMID: 15903075]

~~132~~133 Abdel-Wahab MF, Zakaria S, Kamel M, Abdel-Khaliq MK, Mabrouk MA, Salama H, Esmat G, Thomas DL, Strickland GT. High seroprevalence of hepatitis C infection among risk groups in Egypt. *Am J Trop Med Hyg* 1994; **51**(5): 563-567 [PMID: 7527186]

~~133~~134 El-Gilany AH, El-Fedawy S. Bloodborne infections among student voluntary blood donors in Mansoura University, Egypt. *East Mediterr Health J* 2006; **12**(6): 742-748 [PMID: 17333818]

~~134~~135 Wasfi OA, Sadek NA. Prevalence of hepatitis B surface antigen and hepatitis C virus antibodies among blood donors in Alexandria, Egypt. *Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit* 2011; **17**(3): 238-242 [PMID: 21735965]

~~135~~136 Farawela H, Khorshied M, Shaheen I, Gouda H, Nasef A, Abulata N, Mahmoud HA, Zawam HM, Mousa SM. The association between hepatitis C virus infection, genetic polymorphisms of oxidative stress genes and B-cell non-Hodgkin's lymphoma risk in Egypt. *Infection, Genetics and Evolution* 2012; **12**(6): 1189-1194 [PMID: 2012327087~~]~~ DOI: http://dx.doi.org/10.1016/j.meegid.2012.04.007]

~~136~~137 Khattab MA, Eslam M, Sharwae MA, Hamdy L. Seroprevalence of hepatitis C and B among blood donors in Egypt: Minya Governorate, 2000-2008. *American Journal of Infection Control* 2010; **38**(8): 640-641 [PMID: 2010536158 DOI: http://dx.doi.org/10.1016/j.ajic.2009.12.016]

~~137~~138 Tanaka Y, Agha S, Saudy N, Kurbanov F, Orito E, Kato T, Abo-Zeid M, Khalaf M, Miyakawa Y, Mizokami M. Exponential spread of hepatitis C virus genotype 4a in Egypt. *J Mol Evol* 2004; **58**(2): 191-195 [PMID: 15042339~~]~~ DOI: http://dx.doi.org/10.1007/s00239-003-2541-3]

~~138~~139 Darwish MA, Raouf TA, Rushdy P, Constantine NT, Rao MR, Edelman R. Risk factors associated with a high seroprevalence of hepatitis C virus infection in Egyptian blood donors. *Am J Trop Med Hyg* 1993; **49**(4): 440-447 [PMID: 7692754]

~~139~~140 El Gohary A, Hassan A, Nooman Z, Lavanchy D, Mayerat C, El Ayat A, Fawaz N, Gobran F, Ahmed M, Kawano F, et al. High prevalence of hepatitis C virus among urban and rural population groups in Egypt. *Acta Trop* 1995; **59**(2): 155-161 [PMID: 7545863 DOI: 0001706X9500075P [pii]]

带格式的：无下划线，字体颜色：自动设置

带格式的：无下划线，字体颜色：自动设置

~~140~~141 Awadalla HI, Ragab MH, Nassar NA, Osman MAH. Risk factors of hepatitis C infection among Egyptian blood donors. *Central European Journal of Public Health* 2011; **19**(4): 217-221 [PMID: 22432397]

~~141~~142 Arthur RR, Hassan NF, Abdallah MY, el-Sharkawy MS, Saad MD, Hackbart BG, Imam IZ. Hepatitis C antibody prevalence in blood donors in different governorates in Egypt. *Trans R Soc Trop Med Hyg* 1997; **91**(3): 271-274 [PMID: 9231192~~]~~ DOI: http://dx.doi.org/10.1016/S0035-9203(97)90070-5]

~~142~~143 Bassily S, Hyams KC, Fouad RA, Samaan MD, Hibbs RG. A high risk of hepatitis C infection among Egyptian blood donors: the role of parenteral drug abuse. *Am J Trop Med Hyg* 1995; **52**(6): 503-505 [PMID: 7541968]

~~143~~144 El-Raziky MS, El-Hawary M, Esmat G, Abouzied AM, El-Koofy N, Mohsen N, Mansour S, Shaheen A, Abdel Hamid M, El-Karaksy H. Prevalence and risk factors of asymptomatic hepatitis C virus infection in Egyptian children. *World J Gastroenterol* 2007; **13**(12): 1828-1832 [PMID: 17465475]

~~144~~145 El Sherbini A, Mohsen SA, Hasan W, Mostafa S, El Gohary K, Moneib A, Abaza AH. The peak impact of an Egyptain outbreak of hepatitis C virus: Has it passed or has not yet occurred? *Liver International* 2007; **27**(6): 876-877 [PMID: 2007341695 DOI: http://dx.doi.org/10.1111/j.1478-3231.2007.01501.x]

~~145~~146 Abdel-Wahab MF, Zakaria S, Kamel M, Abdel-Khaliq MK, Mabrouk MA, Salama H, Esmat G, Thomas DL, Strickland GT. High seroprevalence of hepatitis C infection among risk groups in Egypt. *American Journal of Tropical Medicine and Hygiene* 1994; **51**(5): 563-567 [PMID: 1994374394]

~~146~~147 Madwar MA, El-Gindy I, Fahmy HM, Shoeb NM, Massoud BA. Hepatitis C virus transmission in family members of Egyptian patients with HCV related chronic liver disease. *J Egypt Public Health Assoc* 1999; **74**(3-4): 313-332 [PMID: 17219873]

~~147~~148 Shemer-Avni Y, el Astal Z, Kemper O, el Najjar KJ, Yaari A, Hanuka N, Margalith M, Sikuler E. Hepatitis C virus infection and genotypes in Southern Israel and the Gaza Strip. *J Med Virol* 1998; **56**(3): 230-233 [PMID: 9783690~~]~~ DOI:http://dx.doi.org/10.1002/(SICI)1096-9071(199811)56:3<230::AID-JMV9>3.0.CO;2-8]

~~148~~149 El-Ghazzawi E, Drew L, Hamdy L, El-Sherbini E, Sadek Sel D, Saleh E. Intravenous drug addicts: a high risk group for infection with human immunodeficiency virus, hepatitis viruses, cytomegalo virus and bacterial infections in Alexandria Egypt. *J Egypt Public Health Assoc* 1995; **70**(1-2): 127-150 [PMID: 17214204]

~~149~~150 Salama KM, Selim Oel S. Hepatitis G virus infection in multitransfused Egyptian children. *Pediatric hematology and oncology* 2009; **26**(4): 232-239 [PMID: 19437325 DOI: 10.1080/08880010902897591]

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带格式的：无下划线，字体颜色：自动设置

~~150~~151 Lehman EM, Wilson ML. Epidemiology of hepatitis viruses among hepatocellular carcinoma cases and healthy people in Egypt: a systematic review and meta-analysis. *Int J Cancer* 2009; **124**(3): 690-697 [PMID: 18973270 DOI: 10.1002/ijc.23937]

~~151~~152 Kumar RM, Frossad PM, Hughes PF. Seroprevalence and mother-to-infant transmission of hepatitis C in asymptomatic Egyptian women. *Eur J Obstet Gynecol Reprod Biol* 1997; **75**(2): 177-182 [PMID: 9447371~~]~~ DOI: http://dx.doi.org/10.1016/S0301-2115(97)00130-9]

~~152~~153 Hassan MM, Zaghloul AS, El-Serag HB, Soliman O, Patt YZ, Chappell CL, Beasley RP, Hwang LY. The role of hepatitis C in hepatocellular carcinoma: a case control study among Egyptian patients. *J Clin Gastroenterol* 2001; **33**(2): 123-126 [PMID: 11468438~~]~~ DOI: http://dx.doi.org/10.1097/00004836-200108000-00006]

~~153~~154 Strickland GT, Elhefni H, Salman T, Waked I, Abdel-Hamid M, Mikhail NN, Esmat G, Fix A. Role of hepatitis C infection in chronic liver disease in Egypt. *American Journal of Tropical Medicine and Hygiene* 2002; **67**(4): 436-442 [PMID: 2002408347]

~~154~~155 Hassan NF, Kotkat A. Prevalence of antibodies to hepatitis C virus in pregnant women in Egypt. *The Journal of infectious diseases* 1993; **168**(1): 248-249 [PMID: 8390542~~]~~ DOI: http://dx.doi.org/10.1093/infdis/168.1.248]

~~155~~156 Zahran KM, Badary MS, Agban MN, Abdel Aziz NH. Pattern of hepatitis virus infection among pregnant women and their newborns at the Women's Health Center of Assiut University, Upper Egypt. *International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics* 2010; **111**(2): 171-174 [PMID: 20708181 DOI: 10.1016/j.ijgo.2010.06.013]

~~156~~157 Abo Elmagd EK, Abdel-Wahab KS, Alrasheedy ZE, Khalifa AS. An Egyptian study of mother to child transmission of hepatitis C virus. *International Journal of Virology* 2011; **7**(3): 100-108 [PMID: 2011661697 DOI: http://dx.doi.org/10.3923/ijv.2011.100.108]

~~157~~158 Kassem AS, El-Nawawy AA, Massoud MN, Abou El-Nazar SY, Sobhi EM. Prevalence of hepatitis C virus (HCV) infection and its vertical transmission in Egyptian pregnant women and their newborns. *Journal of tropical pediatrics* 2000; **46**(4): 231-233 [PMID: 2000278144~~]~~ DOI:http://dx.doi.org/10.1093/tropej/46.4.231]

~~158~~159 Arafa N, El Hoseiny M, Rekacewicz C, Bakr I, El-Kafrawy S, El Daly M, Aoun S, Marzouk D, Mohamed MK, Fontanet A. Changing pattern of hepatitis C virus spread in rural areas of Egypt. *J Hepatol* 2005; **43**(3): 418-424 [PMID: 16019104~~]~~ DOI: http://dx.doi.org/10.1016/j.jhep.2005.03.021]

~~159~~160 Nafeh MA, Medhat A, Shehata M, Mikhail NNH, Swifee Y, Abdel-Hamid M, Watts S, Fix AD, Strickland GT, Anwar W, Sallam I. Hepatitis C in a community in upper Egypt: I. Cross-sectional survey. *American Journal of Tropical Medicine and Hygiene* 2000; **63**(5-6): 236-241 [PMID: 2001212370]

带格式的：无下划线，字体颜色：自动设置

带格式的：无下划线，字体颜色：自动设置

~~160~~161 Abdel-Aziz F, Habib M, Mohamed MK, Abdel-Hamid M, Gamil F, Madkour S, Mikhail NN, Thomas D, Fix AD, Strickland GT, Anwar W, Sallam I. Hepatitis C virus (HCV) infection in a community in the Nile Delta: Population description and HCV prevalence. *Hepatology* 2000; **32**(1): 111-115 [PMID: 2000235687] DOI: http://dx.doi.org/10.1053/jhep.2000.8438]

~~161~~162 Aguilar CE, Soliman AS, McConnell DS, Zekri AR, Banerjee M, Omar A, Sharawy M, Omar S, Raouf A, Sowers MR. Androgen profiles among Egyptian adults considering liver status. *Journal of gastroenterology and hepatology* 2008; **23**(7 Pt 2): e137-145 [PMID: 17524040 DOI: 10.1111/j.1440-1746.2007.04949.x]

~~162~~163 Darwish MA, Faris R, Darwish N, Shouman A, Gadallah M, El-Sharkawy MS, Edelman R, Grumbach K, Rao MR, Clemens JD. Hepatitis c and cirrhotic liver disease in the Nile delta of Egypt: a community-based study. *Am J Trop Med Hyg* 2001; **64**(3-4): 147-153 [PMID: 11442209]

~~163~~164 El-Sayed NM, Gomatos PJ, Rodier GR, Wierzba TF, Darwish A, Khashaba S, Arthur RR. Seroprevalence survey of Egyptian tourism workers for hepatitis B virus, hepatitis C virus, human immunodeficiency virus, and Treponema pallidum infections: association of hepatitis C virus infections with specific regions of Egypt. *Am J Trop Med Hyg* 1996; **55**(2): 179-184 [PMID: 8780457]

~~164~~165 Mohamed MK, Hussein MH, Massoud AA, Rakhaa MM, Shoeir S, Aoun AA, Aboul Naser M. Study of the risk factors for viral hepatitis C infection among Egyptians applying for work abroad. *J Egypt Public Health Assoc* 1996; **71**(1-2): 113-147 [PMID: 17217004]

~~165~~166 Ansar MM, Kooloobandi A. Prevalence of hepatitis C virus infection in thalassemia and haemodialysis patients in north Iran-Rasht. *J Viral Hepat* 2002; **9**(5): 390-392 [PMID: 12225335] DOI: http://dx.doi.org/10.1046/j.1365-2893.2002.00368.x]

~~166~~167 Karimi M, Ghavanini AA. Seroprevalence of HBsAg, anti-HCV, and anti-HIV among haemophiliac patients in Shiraz, Iran. *Haematologia (Budap)* 2001; **31**(3): 251-255 [PMID: 11855788] DOI: http://dx.doi.org/10.1163/15685590152763809]

~~167~~168 Ghavanini AA, Sabri MR. Hepatitis B surface antigen and anti-hepatitis C antibodies among blood donors in the Islamic Republic of Iran. *East Mediterr Health J* 2000; **6**(5-6): 1114-1116 [PMID: 12197336]

~~168~~169 Rezvan H, Ahmadi J, Farhadi M, Taroyan S. A preliminary study on the prevalence of anti-HCV amongst healthy blood donors in Iran. *Vox Sang* 1994; **67**: 100

~~169~~170 Rahbar AR, Rooholamini S, Khoshnood K. Prevalence of HIV infection and other blood-borne infections in incarcerated and non-incarcerated injection drug users (IDUs) in Mashhad, Iran. *International Journal of Drug Policy* 2004; **15**(2): 151-155 [DOI: http://dx.doi.org/10.1016/j.drugpo.2003.07.001]

~~170~~171 Pourshams A, Malekzadeh R, Monavvari A, Akbari MR, Mohamadkhani A, Yarahmadi S, Seddighi N, Mohamadnejad M, Sotoudeh M, Madjlessi A. Prevalence

and etiology of persistently elevated alanine aminotransferase levels in healthy Iranian blood donors. *Journal of Gastroenterology and Hepatology* 2005; **20**(2): 229-233 [PMID: 15683425 DOI: http://dx.doi.org/10.1111/j.1440-1746.2004.03511.x]

~~171~~172 Khedmat H, Fallahian F, Abolghasemi H, Alavian SM, Hajibeigi B, Miri SM, Jafari AM. Seroepidemiologic study of hepatitis B virus, hepatitis C virus, human immunodeficiency virus and syphilis infections in Iranian blood donors. *Pak J Biol Sci* 2007; **10**(24): 4461-4466 [PMID: 19093512 DOI: http://dx.doi.org/10.3923/pjbs.2007.4461.4466]

~~172~~173 Vahdani P, Hosseini-Moghaddam SM, Gachkar L, Sharafi K. Prevalence of hepatitis B, hepatitis C, human immunodeficiency virus, and syphilis among street children residing in southern Tehran, Iran. *Arch Iran Med* 2006; **9**(2): 153-155 [PMID: 16649359]

~~173~~174 Karimi M, Ghavanini AA. Seroprevalence of hepatitis B, hepatitis C and human immunodeficiency virus antibodies among multitransfused thalassaemic children in Shiraz, Iran. *Journal of paediatrics and child health* 2001; **37**(6): 564-566 [PMID: 11903836~~]~~ DOI: http://dx.doi.org/10.1046/j.1440-1754.2001.00709.x]

~~174~~175 Hajiani E, Hashemi J, Masjedizadeh R, Shayesteh AA, Idani E, Rajabi T. Seroepidemiology of hepatitis C and its risk factors in Khuzestan Province, south-west of Iran: a case-control study. *World J Gastroenterol* 2006; **12**(30): 4884-4887 [PMID: 16937474]

~~175~~176 Hosseini Asl SK, Avijgan M, Mohamadnejad M. High Prevalence of HBV, HCV, and HIV Infections: In Gypsy Population Residing In Shar-e-kord. *Arch Iranian Med* 2004; **7**(1): 22-24

~~176~~177 Gholamreza R, Shahryar S, Abbasali K, Hamidreza J, Abdolvahab M, Khodaberdi K, Danyal R, Nafiseh A. Seroprevalence of hepatitis B virus and its co-infection with hepatitis D virus and hepatitis C virus in Iranian adult population. *Indian J Med Sci* 2007; **61**(5): 263-268 [PMID: 17478956~~]~~ DOI: http://dx.doi.org/10.4103/0019-5359.32092]

~~177~~178 Al-Kubaisy WA, Niazi AD, Kubba K. History of miscarriage as a risk factor for hepatitis C virus infection in pregnant Iraqi women. *East Mediterr Health J* 2002; **8**(2-3): 239-244 [PMID: 15339110]

~~178~~179 Ameen R, Sanad N, Al-Shemmari S, Siddique I, Chowdhury RI, Al-Hamdan S, Al-Bashir A. Prevalence of viral markers among first-time Arab blood donors in Kuwait. *Transfusion* 2005; **45**(12): 1973-1980 [PMID: 16371052~~]~~ DOI: http://dx.doi.org/10.1111/j.1537-2995.2005.00635.x]

~~179~~180 Chehadeh W, Kurien SS, Abdella N, Ben-Nakhi A, Al-Arouj M, Almuaili T, Al-Mutairi O, Al-Nakib W. Hepatitis C virus infection in a population with high incidence of type 2 diabetes: Impact on diabetes complications. *Journal of Infection and*

Public Health 2011; **4**(4): 200-206 [PMID: 2011568477 DOI: http://dx.doi.org/10.1016/j.jiph.2011.05.004]

~~180~~181 Tamim H, Irani-Hakime N, Aoun JP, Khoury S, Samaha H, Almawi WY. Seroprevalence of hepatitis C virus (HCV) infection among blood donors: a hospital-based study. *Transfus Apher Sci* 2001; **24**(1): 29-35 [PMID: 11515608~~]~~ DOI: http://dx.doi.org/10.1016/S0955-3886(00)00124-7]

~~181~~182 Irani-Hakime N, Tamim H, Samaha H, Almawi WY. Prevalence of antibodies against hepatitis C virus among blood donors in Lebanon, 1997-2000. *Clin Lab Haematol* 2001; **23**(5): 317-323 [PMID: 11703415 DOI: http://dx.doi.org/10.1046/j.1365-2257.2001.00409.x]

~~182~~183 Irani-Hakime N, Musharrafieh U, Samaha H, Almawi WY. Prevalence of antibodies against hepatitis B virus and hepatitis C virus among blood donors in Lebanon, 1997-2003. *Am J Infect Control* 2006; **34**(4): 241-243 [PMID: 16679184~~]~~ DOI: http://dx.doi.org/10.1016/j.ajic.2005.06.009]

~~183~~184 Araj GF, Kfoury-Baz EE, Barada KA, Nassif RE, Alami SY. Hepatitis C virus : prevalence in Lebanese blood donors and brief overview of the disease. *J Med Liban* 1995; **43**(1): 11-16 [PMID: 8676356]

~~184~~185 Baddoura R, Haddad C, Germanos M. Hepatitis B and C seroprevalence in the Lebanese population. *East Mediterr Health J* 2002; **8**(1): 150-156 [PMID: 15330570]

~~185~~186 Daw MA, Elkaber MA, Drah AM, Werfalli MM, Mihat AA, Siala IM. Prevalence of hepatitis C virus antibodies among different populations of relative and attributable risk. *Saudi medical journal* 2002; **23**(11): 1356-1360 [PMID: 12506296]

~~186~~187 Elzouki AN, Beeching NJ, Mutton KJ, Garson JA. Anti-HCV antibodies and HCV RNA in Libyan blood donors. *Vox Sang* 1995; **68**(1): 65 [PMID: 7536992~~]~~ DOI: http://dx.doi.org/10.1111/j.1423-0410.1995.tb02551.x]

~~187~~188 Saleh MG, Pereira LM, Tibbs CJ, Ziu M, al-Fituri MO, Williams R, McFarlane IG. High prevalence of hepatitis C virus in the normal Libyan population. ~~*Trans R Soc Trop Med Hyg*~~*Transactions of the Royal Society of Tropical Medicine and Hygiene* 1994; **88**(3): 292-294 [PMID: 7974663~~]~~ DOI: http://dx.doi.org/10.1016/0035-9203(94)90082-5]

~~188~~189 Shabash A, Habas M, Alhajrasi A, Furarah A, Bouzedi A, Daw M. Forecast modelling for prediction of hepatitis B and hepatitis C seropositivity among Libyan population. *Clinical Microbiology and Infection* 2010; **16**: S310 [PMID: 70195731 DOI: http://dx.doi.org/10.1111/j.1469-0691.2010.03239.x]

~~189~~190 Libya National Center for the Prevention of and Control of Infectious Diseases. Results of the National Seroprevalence Survey. 2005

~~190~~191 Benjelloun S, Bahbouhi B, Sekkat S, Bennani A, Hda N, Benslimane A. Anti-HCV seroprevalence and risk factors of hepatitis C virus infection in Moroccan population groups. *Res Virol* 1996; **147**(4): 247-255 [PMID: 8837233]

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~~191~~192 Zohoun A, Hadef R, Zahid H, Benkirane M. [Seroprevalence of HBV and HCV in blood donors at the Blood Transfusion Center of Mohammed V Military Teaching Hospital in Rabat Morocco]. [French]

Prevalence des marqueurs seriques des virus de l'hepatite B et C chez les donneurs de sang au Centre de Transfusion Sanguine de l'Hopital Militaire d'Instruction Mohammed V de Rabat (Maroc). *Medecine tropicale : revue du Corps de sante colonial* 2011; **71**(5): 513-514 [PMID: 22235634]

~~192~~193 Lahlou Amine I, Zouhair S, Chegri M, L'Kassmi H. Seroprevalence of anti-HCV in patients of the Military Hospital Moulay Ismail (Meknes, Morocco): Data analysis of the medical biology laboratory (2002-2005). [French]

Seroprevalence des anticorps anti-VHC chez les patients de l'hopital militaire Moulay Ismail (Meknes, Maroc): Analyse des donnees du laboratoire de biologie medicale (2002-2005). *Bulletin de la Societe de Pathologie Exotique* 2010; **103**(4): 255-258 [PMID: 20596810 DOI: http://dx.doi.org/10.1007/s13149-010-0064-x]

~~193~~194 Aqodad N, Lahbabi M, Elyousfi M, Mellouki I, Benajah D, Elabkari M, Ibrahimi A. Prevalence of VHC-Ab and HBsAg among blood donors in Guelmim in the south of Morocco. *Hepatology International* 2011; **5 (1)**: 96 [PMID: 70369163 DOI: http://dx.doi.org/10.1007/s12072-010-9241-z]

~~194~~195 WHO/EMRO. Regional database on HIV/AIDS. WHO Regional Office for the Eastern Mediterranean.

~~195~~196 Al-Dhahry SHS, Buhl MR, Daar AS, Aganashinikar PN, Al-Hasani MK. Prevalence of antibodies to hepatitis C virus among Omani patients with renal disease. *Infection* 1993; **21**(3): 164-167 [DOI: http://dx.doi.org/10.1007/BF01710538]

~~196~~197 Alnaqy A, Al-Harthy S, Kaminski G, Al-Dhahry S. Detection of serum antibodies to hepatitis C virus in 'false-seronegative' blood donors in Oman. *Med Princ Pract* 2006; **15**(2): 111-113 [PMID: 16484837 DOI: http://dx.doi.org/10.1159/000090914]

~~197~~198 Schuster H, Serebour E, Nograles J, Al-Belushi I, Hassan K. Prevelance of blood-borne viruses amongst antenatal clinic patients and blood donors in a tertiary referral hospital in Oman. *Clinical Microbiology and Infection* 2009; **15**: S587 [PMID: 70071995 DOI: http://dx.doi.org/10.1111/j.1469-0691.2009.02858.x]

~~198~~199 Al-Dhahry SHS, Aghanashinikar PN, Al-Hasani MK, Buhl MR, Daar AS. Prevalence of antibodies to hepatitis C virus among Omani patients with renal disease. *Infection* 1993; **21**(3): 164-167 [PMID: 1993197158~~]~~ DOI: http://dx.doi.org/10.1007/BF01710538]

~~199~~200 Pathare N, Al Abri SR, Al Siyabi B, Serebour F, Pathare A, Alkindi S. Seroprevalence of HBSAG, HCV, HIV, HBV PCR and RPR affecting the donor deferral patterns. *Transfusion* 2012; **52**: 216A [PMID: 70878251 DOI: http://dx.doi.org/10.1111/j.1537-2995.2012.03833-1.x]

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带格式的：无下划线，字体颜色：自动设置

~~200~~201 Abdul Mujeeb S, Aamir K, Mehmood K. Seroprevalence of HBV, HCV and HIV infections among college going first time voluntary blood donors. *J Pak Med Assoc* 2000; **50**(8): 269-270 [PMID: 10992712]

~~201~~202 Mujeeb SA, Aamir K, Mehmood K. Seroprevalence of HBV, HCV and HIV infections among college going first time voluntary blood donors. *J Pak Med Assoc* 2006; **56**(1 Suppl 1): S24-25 [PMID: 16689479]

~~202~~203 Kakepoto GN, Bhally HS, Khaliq G, Kayani N, Burney IA, Siddiqui T, Khurshid M. Epidemiology of blood-borne viruses: a study of healthy blood donors in Southern Pakistan. *Southeast Asian J Trop Med Public Health* 1996; **27**(4): 703-706 [PMID: 9253870]

~~203~~204 Akhtar S, Younus M, Adil S, Jafri SH, Hassan F. Hepatitis C virus infection in asymptomatic male volunteer blood donors in Karachi, Pakistan. *J Viral Hepat* 2004; **11**(6): 527-535 [PMID: 15500553~~]~~ DOI: http://dx.doi.org/10.1111/j.1365-2893.2004.00518.x]

~~204~~205 Sultan F, Mehmood T, Mahmood MT. Infectious pathogens in volunteer and replacement blood donors in Pakistan: a ten-year experience. *Int J Infect Dis* 2007; **11**(5): 407-412 [PMID: 17331775~~]~~ DOI: http://dx.doi.org/10.1016/j.ijid.2006.10.004]

~~205~~206 Abdul Mujeeb S, Nanan D, Sabir S, Altaf A, Kadir M. Hepatitis B and C infection in first-time blood donors in Karachi--a possible subgroup for sentinel surveillance. *East Mediterr Health J* 2006; **12**(6): 735-741 [PMID: 17333817]

~~206~~207 Khattak MF, Salamat N, Bhatti FA, Qureshi TZ. Seroprevalence of hepatitis B, C and HIV in blood donors in northern Pakistan. *J Pak Med Assoc* 2002; **52**(9): 398-402 [PMID: 12532573]

~~207~~208 Ahmad N, Asgher M, Shafique M, Qureshi JA. An evidence of high prevalence of Hepatitis C virus in Faisalabad, Pakistan. *Saudi Med J* 2007; **28**(3): 390-395 [PMID: 17334466]

~~208~~209 Jafri W, Jafri N, Yakoob J, Islam M, Tirmizi SF, Jafar T, Akhtar S, Hamid S, Shah HA, Nizami SQ. Hepatitis B and C: prevalence and risk factors associated with seropositivity among children in Karachi, Pakistan. *BMC Infect Dis* 2006; **6**: 101 [PMID: 16792819~~]~~ DOI: http://dx.doi.org/10.1186/1471-2334-6-101]

~~209~~210 Agboatwalla M, Isomura S, Miyake K, Yamashita T, Morishita T, Akram DS. Hepatitis A, B and C seroprevalence in Pakistan. *Indian J Pediatr* 1994; **61**(5): 545-549 [PMID: 7538098~~]~~ DOI: http://dx.doi.org/10.1007/BF02751716]

~~210~~211 Akhtar S, Moatter T, Azam SI, Rahbar MH, Adil S. Prevalence and risk factors for intrafamilial transmission of hepatitis C virus in Karachi, Pakistan. *J Viral Hepat* 2002; **9**(4): 309-314 [PMID: 12081609~~]~~ DOI: http://dx.doi.org/10.1046/j.1365-2893.2002.00350.x]

~~211~~212 Parker SP, Khan HI, Cubitt WD. Detection of antibodies to hepatitis C virus in dried blood spot samples from mothers and their offspring in Lahore, Pakistan. *J Clin Microbiol* 1999; **37**(6): 2061-2063 [PMID: 10325381]

~~212~~213 Aslam M, Aslam J. Seroprevalence of the antibody to hepatitis C in select groups in the Punjab region of Pakistan. *J Clin Gastroenterol* 2001; **33**(5): 407-411 [PMID: 11606859~~]~~ DOI: http://dx.doi.org/10.1097/00004836-200111000-00013]

~~213~~214 Lema AM, Cox EA. Hepatitis C antibodies among blood donors in Qatar. *Vox Sang* 1992; **63**(3): 237 [PMID: 1333139~~]~~ DOI: http://dx.doi.org/10.1111/j.1423-0410.1992.tb05110.x]

~~214~~215 Fawzi Z, Al Hilali A, Al Malki A, Al Matawa H, Yousef B, Ali Bin Ali A, Al Mansour S. Survey of hepatitis markers among donors in the State of Qatar. *Qatar Medical Journal* 2007; **16**(2): 47-50 [PMID: 2008481374]

~~215~~216 Sharma M, Matar K, Dweik NA, Kaabi SA, John AK, Mohannadi MA, Derbala MF, Amin AA, Pasic F, Yakoob R, Butt T. Early detection of hepatitis C using a one minute visual qualitative based kit system in a community based setting in Doha, Qatar. *Journal of Hepatology* 2010; **52**: S260 [PMID: 70131519 DOI: http://dx.doi.org/10.1016/S0168-8278%2810%2960669-1]

~~216~~217 Mahaba H, el-Tayeb Ael K, Elbaz H. The prevalence of antibodies to hepatitis C virus in Hail region, Saudi Arabia. *J Egypt Public Health Assoc* 1999; **74**(1-2): 69-80 [PMID: 17216953]

~~217~~218 Bashawri LA, Fawaz NA, Ahmad MS, Qadi AA, Almawi WY. Prevalence of seromarkers of HBV and HCV among blood donors in eastern Saudi Arabia, 1998-2001. *Clin Lab Haematol* 2004; **26**(3): 225-228 [PMID: 15163322~~]~~ DOI: http://dx.doi.org/10.1111/j.1365-2257.2004.00601.x]

~~218~~219 El-Hazmi MM. Prevalence of HBV, HCV, HIV-1, 2 and HTLV-I/II infections among blood donors in a teaching hospital in the Central region of Saudi Arabia. *Saudi Med J* 2004; **25**(1): 26-33 [PMID: 14758374]

~~219~~220 Abdelaal M, Rowbottom D, Zawawi T, Scott T, Gilpin C. Epidemiology of hepatitis C virus: a study of male blood donors in Saudi Arabia. *Transfusion* 1994; **34**(2): 135-137 [PMID: 8310483~~]~~ DOI: http://dx.doi.org/10.1046/j.1537-2995.1994.34294143941.x]

~~220~~221 Al-Mofarreh M, Fakunle YM, El-Karamany WM, Ezzat HO, Ballesteros MN, Khawaji MZ, El-Drees AZ. Prevalence of antibodies to hepatitis C virus in blood donors in Riyadh. *Annals of Saudi Medicine* 1991; **11**(5): 501-503 [PMID: 1991287154]

~~221~~222 Bernvil SS, Andrews VJ, Kariem AA. Hepatitis C antibody prevalence in Saudi Arabian blood donor population. *Annals of Saudi Medicine* 1991; **11**(5): 563-567 [PMID: 1991287167]

~~222~~223 Al-Knawy B, El Mekki AA, Hamdi J, Thiga R, Sheikha A. Prevalence of antibody to hepatitis C virus in Saudi blood donors, PREVALENCE DE L'ANTICORPS

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ANTI-VIRUS DE L'HEPATITE C CHEZ DES DONNEURS DE SANG SAOUDIENS. *Canadian Journal of Gastroenterology* 1995; **9**(3): 141-143 [PMID: 1995168583]

~~223~~224 Al-Sohaibani MO, Al-Sheikh EH, Al-Ballal SJ, Mirghani MAM, Ramia S. Occupational risk of hepatitis B and C infections in Saudi medical staff. *Journal of Hospital Infection* 1995; **31**(2): 143-147 [PMID: 1995332172 DOI: http://dx.doi.org/10.1016/0195-6701%2895%2990169-8]

~~224~~225 Halawani M, Bakir TM. Determination of hepatitis C virus genotypes in pruritus patients in Saudi Arabia. *Genetic Testing and Molecular Biomarkers* 2012; **16**(1): 46-49 [PMID: 2012058146 DOI: http://dx.doi.org/10.1089/gtmb.2011.0064]

~~225~~226 Al Nasser MN. Intrafamilial transmission of hepatitis C virus (HCV): a major mode of spread in the Saudi Arabia population. *Ann Trop Paediatr* 1992; **12**(2): 211-215 [PMID: 1381898]

~~226~~227 Njoh J, Zimmo S. Prevalence of antibodies to hepatitis C virus in drug-dependent patients in Jeddah, Saudi Arabia. *East Afr Med J* 1997; **74**(2): 89-91 [PMID: 9185392]

~~227~~228 Fakeeh M, Zaki AM. Hepatitis C: prevalence and common genotypes among ethnic groups in Jeddah, Saudi Arabia. *Am J Trop Med Hyg* 1999; **61**(6): 889-892 [PMID: 10674665]

~~228~~229 Bahakim H, Bakir TMF, Arif M, Ramia S. Hepatitis C virus antibodies in high-risk Saudi groups. *Vox Sanguinis* 1991; **60**(3): 162-164 [PMID: 1991177724~~]~~ DOI: http://dx.doi.org/10.1111/j.1423-0410.1991.tb00894.x]

~~229~~230 Al Karawi MA, Shariq S, El Shiekh Mohamed AR, Saeed AA, Ahmed AMM. Hepatitis C virus infection in chronic liver disease and hepatocellular carcinoma in Saudi Arabia. *Journal of Gastroenterology and Hepatology* 1992; **7**(3): 237-239 [PMID: 1992173994~~]~~ DOI: http://dx.doi.org/10.1111/j.1440-1746.1992.tb00970.x]

~~230~~231 Mahaba H, el-Tayeb AK, Elbaz H. The prevalence of antibodies to hepatitis C virus in Hail region, Saudi Arabia. *The Journal of the Egyptian Public Health Association* 1999; **74**(1-2): 69-80 [PMID: 17216953]

~~231~~232 Nur YA, Groen J, Elmi AM, Ott A, Osterhaus AD. Prevalence of serum antibodies against bloodborne and sexually transmitted agents in selected groups in Somalia. *Epidemiol Infect* 2000; **124**(1): 137-141 [PMID: 10722141~~]~~ DOI: http://dx.doi.org/10.1017/S0950268899003441]

~~232~~233 Bile K, Aden C, Norder H, Magnius L, Lindberg G, Nilsson L. Important role of hepatitis C virus infection as a cause of chronic liver disease in Somalia. *Scand J Infect Dis* 1993; **25**(5): 559-564 [PMID: 7506842~~]~~ DOI: http://dx.doi.org/10.3109/00365549309008543]

~~233~~234 McCarthy MC, el-Tigani A, Khalid IO, Hyams KC. Hepatitis B and C in Juba, southern Sudan: results of a serosurvey. *Trans R Soc Trop Med Hyg* 1994; **88**(5): 534-536 [PMID: 7992329~~]~~ DOI: http://dx.doi.org/10.1016/0035-9203(94)90150-3]

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234235 Elsheikh RM, Daak AA, Elsheikh MA, Karsany MS, Adam I. Hepatitis B virus and hepatitis C virus in pregnant Sudanese women. *Virol J* 2007; **4**: 104 [PMID: 17958904] DOI: http://dx.doi.org/10.1186/1743-422X-4-104]

235236 Othman BM, Monem FS. Prevalence of hepatitis C virus antibodies among intravenous drug abusers and prostitutes in Damascus, Syria. *Saudi Med J* 2002; **23**(4): 393-395 [PMID: 11953762]

236237 Hatira SA, Yacoub-Jemni S, Houissa B, Kaabi H, Zaeir M, Kortas M, Ghachem L. [Hepatitis C virus antibodies in 34130 blood donors in Tunisian Sahel]. *Tunis Med* 2000; **78**(2): 101-105 [PMID: 10894044]

237238 Slama H, Mojaat N, Dahri R, Boukef K. [Epidemiologic study of anti-HCV antibodies in Tunisian blood donors]. *Rev Fr Transfus Hemobiol* 1991; **34**(6): 459-464 [PMID: 1663358] DOI: http://dx.doi.org/10.1016/S1140-4639(05)80140-6]

238239 Mejri S, Salah AB, Triki H, Alaya NB, Djebbi A, Dellagi K. Contrasting patterns of hepatitis C virus infection in two regions from Tunisia. *J Med Virol* 2005; **76**(2): 185-193 [PMID: 15834884] DOI: http://dx.doi.org/10.1002/jmv.20342]

239240 Gorgi Y, Yalaoui S, Ben Nejma HL, Azzouz MM, Hsairi M, Ben Khelifa H, Ayed K. [Detection of hepatitis C virus in the general population of Tunisia]. *Bull Soc Pathol Exot* 1998; **91**(2): 177 [PMID: 9642480]

240241 Triki H, Said N, Ben Salah A, Arrouji A, Ben Ahmed F, Bouguerra A, Hmida S, Dhahri R, Dellagi K. Seroepidemiology of hepatitis B, C and delta viruses in Tunisia. *Trans R Soc Trop Med Hyg* 1997; **91**(1): 11-14 [PMID: 9093616] DOI: http://dx.doi.org/10.1016/S0035-9203(97)90374-6]

241242 Ozsoy MF, Oncul O, Cavuslu S, Erdemoglu A, Emekdas G, Pahsa A. Seroprevalences of hepatitis B and C among health care workers in Turkey. *J Viral Hepat* 2003; **10**(2): 150-156 [PMID: 12614472] DOI: http://dx.doi.org/10.1046/j.1365-2893.2003.00404.x]

242243 Gurol E, Saban C, Oral O, Cigdem A, Armagan A. Trends in hepatitis B and hepatitis C virus among blood donors over 16 years in Turkey. *Eur J Epidemiol* 2006; **21**(4): 299-305 [PMID: 16685581] DOI: http://dx.doi.org/10.1007/s10654-006-0001-2]

243244 Sakarya S, Oncu S, Ozturk B, Oncu S. Effect of preventive applications on prevalence of hepatitis B virus and hepatitis C virus infections in West Turkey. *Saudi Med J* 2004; **25**(8): 1070-1072 [PMID: 15322600]

244245 Altindis M, Yilmaz S, Dikengil T, Acemoglu H, Hosoglu S. Seroprevalence and genotyping of hepatitis B, hepatitis C and HIV among healthy population and Turkish soldiers in Northern Cyprus. *World J Gastroenterol* 2006; **12**(42): 6792-6796 [PMID: 17106927]

245246 Mutlu B, Meric M, Willke A. [Seroprevalence of hepatitis B and C virus, human immunodeficiency virus and syphilis in the blood donors]. *Mikrobiyol Bul* 2004; **38**(4): 445-448 [PMID: 15700672]

~~246~~247 Afsar I, Gungor S, Sener AG, Yurtsever SG. The prevalence of HBV, HCV and HIV infections among blood donors in Izmir, Turkey. *Indian J Med Microbiol* 2008; **26**(3): 288-289 [PMID: 18695343~~]~~ DOI: http://dx.doi.org/10.4103/0255-0857.42074]

~~247~~248 Gulcan A, Gulcan E, Toker A, Bulut I, Akcan Y. Evaluation of risk factors and seroprevalence of hepatitis B and C in diabetic patients in Kutahya, Turkey. *J Investig Med* 2008; **56**(6): 858-863 [PMID: 18667903 DOI: 10.231/JIM.0b013e3181788d28

00042871-200808000-00007 [pii]]

~~248~~249 Alim A, Artan MO, Baykan Z, Alim BA. Seroprevalence of hepatitis B and C viruses, HIV, and syphilis infections among engaged couples. *Saudi Med J* 2009; **30**(4): 541-545 [PMID: 19370284 DOI: 2009008' [pii]]

~~249~~250 Tahan V, Karaca C, Yildirim B, Bozbas A, Ozaras R, Demir K, Avsar E, Mert A, Besisik F, Kaymakoglu S, Senturk H, Cakaloglu Y, Kalayci C, Okten A, Tozun N. Sexual transmission of HCV between spouses. *Am J Gastroenterol* 2005; **100**(4): 821-824 [PMID: 15784025~~]~~ DOI: http://dx.doi.org/10.1111/j.1572-0241.2005.40879.x]

~~250~~251 Bozkurt H, Kurtoglu MG, Bayram Y, Kesli R, Berktas M. Distribution of hepatitis C prevalence in individuals according to their age level in Eastern Turkey. *Eur J Gastroenterol Hepatol* 2008; **20**(12): 1249 [PMID: 18989151 DOI: 10.1097/MEG.0b013e328305ba19

00042737-200812000-00019 [pii]]

~~251~~252 Yildirim B, Barut S, Bulut Y, Yenisehirli G, Ozdemir M, Cetin I, Etikan I, Akbas A, Atis O, Ozyurt H, Sahin S. Seroprevalence of hepatitis B and C viruses in the province of Tokat in the Black Sea region of Turkey: A population-based study. *Turk J Gastroenterol* 2009; **20**(1): 27-30 [PMID: 19330732]

~~252~~253 Tekay F, Ozbek E. [Short communication: hepatitis B, hepatitis C and human immunodeficiency virus seropositivities in women admitted to Sanliurfa Gynecology and Obstetrics Hospital]. *Mikrobiyol Bul* 2006; **40**(4): 369-373 [PMID: 17205695]

~~253~~254 Demirturk N, Demirdal T, Toprak D, Altindis M, Aktepe OC. Hepatitis B and C virus in West-Central Turkey: seroprevalence in healthy individuals admitted to a university hospital for routine health checks. *Turk J Gastroenterol* 2006; **17**(4): 267-272 [PMID: 17205404]

~~254~~255 Akcam FZ, Uskun E, Avsar K, Songur Y. Hepatitis B virus and hepatitis C virus seroprevalence in rural areas of the southwestern region of Turkey. *Int J Infect Dis* 2009; **13**(2): 274-284 [PMID: 18945630 DOI: S1201-9712(08)01448-3 [pii]

10.1016/j.ijid.2008.07.005]

~~255~~256 Al Shaer L, Abdulrahman M, John TJ, Alhashimi A. Trends in prevalence, incidence, and residual risk of major transfusion-transmissible viral infections in United Arab Emirates blood donors: Impact of individual-donation nucleic acid testing, 2004

through 2009. *Transfusion* 2012; **52**(11): 2300-2309 [PMID: 2012673309 DOI: http://dx.doi.org/10.1111/j.1537-2995.2012.03740.x]

~~256~~257 Raouf M, Al Amiri A, Gammon R. Demographic profile of blood donors and its influence on the safety of blood transfusion in the United Arab Emirates. *Transfusion* 2010; **50**: 205A [PMID: 70288448 DOI: http://dx.doi.org/10.1111/j.1537-2995.2010.02833-1.x]

~~257~~258 Sheek-Hussein M, Hashmey R, Alsuwaidi AR, Al Maskari F, Amiri L, Souid AK. Seroprevalence of measles, mumps, rubella, varicella-zoster and hepatitis A-C in Emirati medical students. *BMC public health* 2012; **12**: 1047 [PMID: 23217121 PMCID: 3526402 DOI: 10.1186/1471-2458-12-1047]

~~258~~259 Fakhry SM, Al Dawilah TA, Mehta SH. Prevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) in young adults in United Arab Emirates (UAE). *Hepatology* 2011; **54**: 607A [PMID: 70592322 DOI: http://dx.doi.org/10.1002/hep.24666]

~~259~~260 Haidar NA. Prevalence of hepatitis B and hepatitis C in blood donors and high risk groups in Hajjah, Yemen Republic. *Saudi Med J* 2002; **23**(9): 1090-1094 [PMID: 12370719]

~~260~~261 El Guneid AM, Gunaid AA, O'Neill AM, Zureikat NI, Coleman JC, Murray-Lyon IM. Prevalence of hepatitis B, C, and D virus markers in Yemeni patients with chronic liver disease. *J Med Virol* 1993; **40**(4): 330-333 [PMID: 8228926~~]~~ DOI: http://dx.doi.org/10.1002/jmv.1890400413]

~~261~~262 Al-Moslih MI, Al-Huraibi MA. Prevalence of hepatitis C virus among patients with liver disease in the Republic of Yemen. *East Mediterr Health J* 2001; **7**(4-5): 771-778 [PMID: 15332778]

~~262~~263 Todd CS, Abed AM, Strathdee SA, Scott PT, Botros BA, Safi N, Earhart KC. HIV, hepatitis C, and hepatitis B infections and associated risk behavior in injection drug users, Kabul, Afghanistan. *Emerg Infect Dis* 2007; **13**(9): 1327-1331 [PMID: 18252103~~]~~ DOI: http://dx.doi.org/10.3201/eid1309.070036]

~~263~~264 Qadi AA, Tamim H, Ameen G, Bu-Ali A, Al-Arrayed S, Fawaz NA, Almawi WY. Hepatitis B and hepatitis C virus prevalence among dialysis patients in Bahrain and Saudi Arabia: A survey by serologic and molecular methods. *American Journal of Infection Control* 2004; **32**(8): 493-495 [PMID: 2004513204 DOI: http://dx.doi.org/10.1016/j.ajic.2003.12.009]

~~264~~265 Al-Mahroos FT, Ebrahim A. Prevalence of hepatitis B, hepatitis C and human immune deficiency virus markers among patients with hereditary haemolytic anaemias. *Ann Trop Paediatr* 1995; **15**(2): 121-128 [PMID: 7677412]

~~265~~266 Waked IA, Saleh SM, Moustafa MS, Raouf AA, Thomas DL, Strickland GT. High prevalence of hepatitis C in Egyptian patients with chronic liver disease. *Gut* 1995; **37**(1): 105-107 [PMID: 7545630~~]~~ DOI: http://dx.doi.org/10.1136/gut.37.1.105]

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带格式的：无下划线，字体颜色：自动设置

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~~266~~267 Mabrouk GM. Prevalence of hepatitis C infection and schistosomiasis in Egyptian patients with hepatocellular carcinoma. *Dis Markers* 1997; **13**(3): 177-182 [PMID: 9405930]

~~267~~268 Hindy AM, Abdelhaleem ES, Aly RH. Hepatitis B and C viruses among Egyptian dentists. *Egypt Dent J* 1995; **41**(3): 1217-1226 [PMID: 9497659]

~~268~~269 Gohar SA, Khalil RY, Elaish NM, Khedr EM, Ahmed MS. Prevalence of antibodies to hepatitis C virus in hemodialysis patients and renal transplant recipients. *J Egypt Public Health Assoc* 1995; **70**(5-6): 465-484 [PMID: 17214170]

~~269~~270 Hassan AA, Khalil R. Hepatitis C in dialysis patients in egypt: relationship to dialysis duration, blood transfusion, and liver disease. *Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia* 2000; **11**(1): 72-73 [PMID: 18209303]

~~270~~271 El Yazeed SA, N.A EL-G, Younes K, El-Ghobary A. Antiphospholipid antibodies in Egyptian patients with chronic renal failure. *Journal of Medical Sciences* 2006; **6**(3): 468-473 [PMID: 2006323474~~]~~ DOI: http://dx.doi.org/10.3923/jms.2006.468.473]

~~271~~272 Saleh E, McFarland W, Rutherford G, Mandel J, El-Shazaly M, Coates T. Sentinel surveillance for HIV and markers for high risk behaviors among STD clinic attendees in Alexandria, Egypt. XIII International AIDS Conference, Durban, South Africa, Poster MoPeC2398. Proceedings of the XIII International AIDS Conference; 2000~~.~~ [available online at: http://caps.ucsf.edu/uploads/pubs/presentations/pdf/saleh.pdf]

~~272~~273 Quinti I, el-Salman D, Monier MK, Hackbart BG, Darwish MS, el-Zamiaty D, Paganelli R, Pandolfi F, Arthur RR. HCV infection in Egyptian patients with acute hepatitis. *Dig Dis Sci* 1997; **42**(10): 2017-2023 [PMID: 9365128~~]~~ DOI: http://dx.doi.org/10.1023/A:1018897813268]

~~273~~274 Gheith OA, Saad MA, Hassan AA, S AE, Agroudy AE, Sheashaa H, Ghoneim MA. Hepatic dysfunction in kidney transplant recipients: prevalence and impact on graft and patient survival. *Clin Exp Nephrol* 2007; **11**(4): 309-315 [PMID: 18085393~~]~~ DOI: http://dx.doi.org/10.1007/s10157-007-0490-7]

~~274~~275 Tonbary YA, Elashry R, Zaki Mel S. Descriptive epidemiology of hemophilia and other coagulation disorders in mansoura, egypt: retrospective analysis. *Mediterranean journal of hematology and infectious diseases* 2010; **2**(3): e2010025 [PMID: 21415978 PMCID: 3033150 DOI: 10.4084/mjhid.2010.025]

~~275~~276 Said ZN, El-Sayed MH, El-Bishbishi IA, El-Fouhil DF, Abdel-Rheem SE, El-Abedin MZ, Salama, II. High prevalence of occult hepatitis B in hepatitis C-infected Egyptian children with haematological disorders and malignancies. *Liver international : official journal of the International Association for the Study of the Liver* 2009; **29**(4): 518-524 [PMID: 19192168 DOI: 10.1111/j.1478-3231.2009.01975.x]

276277 El-Faramawy AAM, El-Rashidy OF, Tawfik PH, Hussein GH. Transfusion transmitted hepatitis: Where do we stand now? A one center study in upper Egypt. *Hepatitis Monthly* 2012; **12**(4): 286-291 [PMID: 2012285756] DOI: http://dx.doi.org/10.5812/hepatmon.5986]

277278 Mansour AK, Aly RM, Abdelrazek SY, Elghannam DM, Abdelaziz SM, Shahine DA, Elmenshawy NM, Darwish AM. Prevalence of HBV and HCV infection among multi-transfused Egyptian thalassemic patients. *Hematology/ Oncology and Stem Cell Therapy* 2012; **5**(1): 54-59 [PMID: 2012184180]

278279 Omar N, Salama K, Adolf S, El-Saeed GS, Abdel Ghaffar N, Ezzat N. Major risk of blood transfusion in hemolytic anemia patients. *Blood coagulation & fibrinolysis : an international journal in haemostasis and thrombosis* 2011; **22**(4): 280-284 [PMID: 21508832 DOI: 10.1097/MBC.0b013e3283451255]

279280 Ali F, Abdel-Aziz A, Helmy MF, Abdel-Mobdy A, Darwish M. Prevalence of certain sexually transmitted viruses in Egypt. *J Egypt Public Health Assoc* 1998; **73**(3-4): 181-192 [PMID: 17219920]

280281 Jahani MR, Alavian SM, Shirzad H, Kabir A, Hajarizadeh B. Distribution and risk factors of hepatitis B, hepatitis C, and HIV infection in a female population with "illegal social behaviour". *Sex Transm Infect* 2005; **81**(2): 185 [PMID: 15800109 DOI: http://dx.doi.org/10.1136/sti.2004.011114]

281282 Semnani S, Roshandel G, Abdolahi N, Besharat S, Keshtkar AA, Joshaghani H, Moradi A, Kalavi K, Jabbari A, Kabir MJ, Hosseini SA, Sedaqat SM, Danesh A, Roshandel D. Hepatitis B/C virus co-infection in Iran: a seroepidemiological study. *Turk J Gastroenterol* 2007; **18**(1): 20-21 [PMID: 17450490]

282283 Rais-Jalali G, Khajehdehi P. Anti-HCV seropositivity among haemodialysis patients of Iranian origin. ERA-EDTA, 1999: 2055-2056.. [PMID: 10462312]

283284 Nobakht Haghighi A, Zali MR, Nowroozi A. Hepatitis C antibody and related risk factors in hemodialysis patients in Iran. *J Am Soc Nephrology* 2001; **12**: 233A

284285 Khamispoor G, Tahmasebi R. Prevalence of HIV, HBV, HCV and syphilis in high risk groups of Bushehr province (Farsi). *Iranian South Medical Journal* 1999; **1**: 59–53

285286 Mohammad Alizadeh AH, Alavian SM, Jafari K, Yazdi N. Prevalence Of Hbs Ag, Hc Ab & Hiv Ab In The Addict Prisoners Of Hammadan Prison (Iran, 1998). *Journal of Research in Medical Sciences* 2003; **7**(4): 311-313

286287 Amiri ZM, Shakib AJ, Toorchi M. Seroprevalence of hepatitis C and risk factors in haemodialysis patients in Guilan, Islamic Republic of Iran. *East Mediterr Health J* 2005; **11**(3): 372-376 [PMID: 16602456]

287288 Sharifi-Mood B, Alavi-Naini R, Salehi M, Hashemi M, Rakhshani F. Spectrum of clinical disease in a series of hospitalized HIV-infected patients from southeast of Iran. *Saudi Med J* 2006; **27**(9): 1362-1366 [PMID: 16951774]

~~288~~289 Alavian SM, Ardeshiri A, Hajarizadeh B. Prevalence of HCV, HBV and HIV infections among hemophiliacs. *Transfusion Today* 2001; **49**: 4–5

~~289~~290 Karimi M, Yarmohammadi H, Ardeshiri R. Inherited coagulation disorders in southern Iran. *Haemophilia* 2002; **8**(6): 740-744 [DOI: http://dx.doi.org/10.1046/j.1365-2516.2002.00699.x]

~~290~~291 Torabi SA, Abed-Ashtiani K, Dehkhoda R, Moghadam AN, Bahram MK, Dolatkhah R, Babaei J, Taheri N. Prevalence of hepatitis B, C and HIV in hemophiliac patients of East Azarbaijan in 2004. *Blood* 2006; **2**(Sup 7): 291-299

~~291~~292 Javadzadeh H, Attar M, Taher Yavari M. Study of the prevalence of HBV, HCV, and HIV infection in hemophilia and thalassemia population of Yazd (Farsi). *Khoon (Blood)* 2006; **2**: 315–322

~~292~~293 Samimi-Rad K, Shahbaz B. Hepatitis C virus genotypes among patients with thalassemia and inherited bleeding disorders in Markazi province, Iran. *Haemophilia* 2007; **13**(2): 156-163 [PMID: 17286768~~]~~ DOI: http://dx.doi.org/10.1111/j.1365-2516.2006.01415.x]

~~293~~294 Sharifi-Mood B, Eshghi P, Sanei-Moghaddam E, Hashemi M. Hepatitis B and C virus infections in patients with hemophilia in Zahedan, southeast Iran. *Saudi Med J* 2007; **28**(10): 1516-1519 [PMID: 17914511]

~~294~~295 Mansour-Ghanaei F, Fallah MS, Shafaghi A, Yousefi-Mashhoor M, Ramezani N, Farzaneh F, Nassiri R. Prevalence of hepatitis B and C seromarkers and abnormal liver function tests among hemophiliacs in Guilan (northern province of Iran). *Med Sci Monit* 2002; **8**(12): CR797-800 [PMID: 12503038]

~~295~~296 Alavian SM, Gholami B, Masarrat S. Hepatitis C risk factors in Iranian volunteer blood donors: a case-control study. *J Gastroenterol Hepatol* 2002; **17**(10): 1092-1097 [PMID: 12201870~~]~~ DOI: http://dx.doi.org/10.1046/j.1440-1746.2002.02843.x]

~~296~~297 Nakhaie S, Talachian E. Prevalence and characteristic of liver involvement in thalassemia patients with HCV in Ali-Asghar children hospital, Tehran, Iran (Farsi). *Journal of Iranian University Medical Science* 2003; **37**: 799–806

~~297~~298 Kadivar MR, Mirahmadizadeh AR, Karimi A, Hemmati A. The prevalence of HCV and HIV in thalassemia patients in Shiraz, Iran. *Medical Journal of Iranian Hospital* 2001; **4**: 18–20

~~298~~299 Basiratnia M, HosseiniAsl SMK, Avijegan M. Hepatitis C prevalence in thalassemia patients in Sharkord, Iran (Farsi). *Shahrkord University Medical Science Journal* 1999; **4**: 13–18

~~299~~300 Jafroodi M, Asadi R. Prevalence of HCV in thalassemia major patients in Guilan province, Iran. *The 4th congress of Iranian Pediatric Hematology, Oncology Society, September* 2006

300301 Kashef S, Karimi M, Amirghofran Z, Ayatollahi M, Pasalar M, Ghaedian MM, Kashef MA. Antiphospholipid antibodies and hepatitis C virus infection in Iranian thalassemia major patients. *Int J Lab Hematol* 2008; **30**(1): 11-16 [PMID: 18190462]

301302 Talaie H, Shadnia SH, Okazi A, Pajouhmand A, Hasanian H, Arianpoor H. The prevalence of hepatitis B, hepatitis C and HIV infections in non-IV drug opioid poisoned patients in Tehran-Iran. *Pak J Biol Sci* 2007; **10**(2): 220-224 [PMID: 19070018] DOI: http://dx.doi.org/10.3923/pjbs.2007.220.224]

302303 Kheirandish P, SeyedAlinaghi S, Jahani M, Shirzad H, Seyed Ahmadian M, Majidi A, Sharifi A, Hosseini M, Mohraz M, McFarland W. Prevalence and Correlates of Hepatitis C Infection among Male Injection Drug Users in Detention, Tehran, Iran. Unpublished. 2009

303304 Zamani S, Ichikawa S, Nassirimanesh B, Vazirian M, Ichikawa K, Gouya MM, Afshar P, Ono-Kihara M, Ravari SM, Kihara M. Prevalence and correlates of hepatitis C virus infection among injecting drug users in Tehran. *Int J Drug Policy* 2007; **18**(5): 359-363 [PMID: 17854723 DOI: S0955-3959(07)00042-4 [pii]

10.1016/j.drugpo.2007.02.007]

304305 Khani M, Vakili MM. Prevalence and risk factors of HIV, hepatitis B virus, and hepatitis C virus infections in drug addicts among Zanjan prisoners. *Arch Iranian Med* 2003; **6**(1): 1-4

305306 Zali MR, Aghazadeh R, Nowroozi A, Amir-Rasouly H. Anti-HCV antibody among Iranian IV drug users: is it a serious problem. *Arch Iranian Med* 2001; **4**: 115-119

306307 Imani R, Karimi A, Rouzbahani R, Rouzbahani A. Seroprevalence of HBV, HCV and HIV infection among intravenous drug users in Shahr-e-Kord, Islamic Republic of Iran. *East Mediterr Health J* 2008; **14**(5): 1136-1141 [PMID: 19161086]

307308 Mohtasham Amiri Z, Rezvani M, Jafari Shakib R, Jafari Shakib A. Prevalence of hepatitis C virus infection and risk factors of drug using prisoners in Guilan province. *East Mediterr Health J* 2007; **13**(2): 250-256 [PMID: 17684845]

308309 Javadi AA, Avijgan M, Hafizi M. Prevalence of HBV and HCV Infections and Associated Risk Factors in Addict Prisoners. *Iranian J Publ Health* 2006; **35**(4): 33-36

309310 Al-Kubaisy WA, Al-Naib KT, Habib MA. Prevalence of HCV/HIV co-infection among haemophilia patients in Baghdad. *East Mediterr Health J* 2006; **12**(3-4): 264-269 [PMID: 17037693]

310311 Al-Kubaisy WA, Al-Naib KT, Habib M. Seroprevalence of hepatitis C virus specific antibodies among Iraqi children with thalassaemia. *East Mediterr Health J* 2006; **12**(1-2): 204-210 [PMID: 17037239]

311312 Al-Sheyyab M, Batieha A, El-Khateeb M. The prevalence of hepatitis B, hepatitis C and human immune deficiency virus markers in multi-transfused patients. *J*

Trop Pediatr 2001; **47**(4): 239-242 [PMID: 11523766] DOI: http://dx.doi.org/10.1093/tropej/47.4.239]

312313 al-Nakib B, Koshy A, Kaloui M, al-Ramahi S, al-Mufti S, Radhakrishnan S, al-Nakib W. Hepatitis C virus antibody in Kuwait. *Vox Sang* 1992; **63**(1): 75-76 [PMID: 1384237] DOI: http://dx.doi.org/10.1111/j.1423-0410.1992.tb01224.x]

313314 Kapoor M, el-Reshaid K, al-Mufti S, Sanad NA, Koshy A. Is dialysis environment more important than blood transfusion in transmission of hepatitis C virus during hemodialysis? *Vox Sang* 1993; **65**(4): 331 [PMID: 7508661] DOI: http://dx.doi.org/10.1111/j.1423-0410.1993.tb02176.x]

314315 El-Reshaid K, Kapoor M, Sugathan T, Al-Mufti S, Al-Hilali N. Hepatitis C virus infection in patients on maintenance dialysis in kuwait: epidemiological profile and efficacy of prophylaxis. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 144-150 [PMID: 18583854]

315316 Al-Fuzae L, Aboolbacker KC, Al-Saleh Q. beta-Thalassaemia major in Kuwait. *J Trop Pediatr* 1998; **44**(5): 311-312 [PMID: 9819498] DOI: http://dx.doi.org/10.1093/tropej/44.5.311]

316317 Irani-Hakime N, Aoun J, Khoury S, Samaha HR, Tamim H, Almawi WY. Seroprevalence of hepatitis C infection among health care personnel in Beirut, Lebanon. *Am J Infect Control* 2001; **29**(1): 20-23 [PMID: 11172314] DOI: http://dx.doi.org/10.1067/mic.2001.110777]

317318 Ramia S, Mokhbat J, Sibai A, Klayme S, Naman R. Exposure rates to hepatitis C and G virus infections among HIV-infected patients: evidence of efficient transmission of HGV by the sexual route. *Int J STD AIDS* 2004; **15**(7): 463-466 [PMID: 15228731] DOI: http://dx.doi.org/10.1258/0956462041211180]

318319 Alashek W, McIntyre C, Taal M. Morbidity of diabetic end-stage kidney disease patients treated by dialysis in Libya. *Diabetes, Obesity and Metabolism* 2010; **12**: 76-77 [PMID: 70569581 DOI: http://dx.doi.org/10.1111/j.1463-1326.2010.01284.x]

319320 Franka E, El-Zoka AH, Hussein AH, Elbakosh MM, Arafa AK, Ghenghesh KS. Hepatitis B virus and hepatitis C virus in medical waste handlers in Tripoli, Libya. *The Journal of hospital infection* 2009; **72**(3): 258-261 [PMID: 19443080 DOI: 10.1016/j.jhin.2009.03.019]

320321 El-Zouki AY, Bendard AB, Sharif MS. HCV in hemodialysis patients in Benghazi, Libya. *Annals of Saudi medicine* 1993; **13**(2): 203 [PMID: 17590656]

321322 Belbacha I, Cherkaoui I, Akrim M, Dooley KE, El Aouad R. Seroprevalence of hepatitis B and C among barbers and their clients in the Rabat region of Morocco

Seroprevalence de l'hepatite B et C chez les barbiers et leurs clients dans la Region de Rabat (Maroc). *Eastern Mediterranean Health Journal* 2011; **17**(12): 911-919 [PMID: 2012008203]

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~~322~~323 Radoui A, Skalli Z, Haddiya I, Benamar L, Ezzaitouni F, Ouzeddoun N, Bayahia R, Rhou H. Prevalence and predictive factors of anemia after renal transplantation: A moroccan report. *Transplantation proceedings* 2010; **42**(9): 3542-3549 [PMID: 2010651818 DOI: http://dx.doi.org/10.1016/j.transproceed.2010.07.092]

~~323~~324 Boulaajaj K, Elomari Y, Elmaliki B, Madkouri B, Zaid D, Benchemsi N. [Prevalence of hepatitis C, hepatitis B and HIV infection among haemodialysis patients in Ibn-Rochd university hospital, Casablanca]. *Nephrologie & therapeutique* 2005; **1**(5): 274-284 [PMID: 16895696 DOI: 10.1016/j.nephro.2005.06.012]

~~324~~325 Sekkat S, Kamal N, Benali B, Fellah H, Amazian K, Bourquia A, El Kholti A, Benslimane A. [Prevalence of anti-HCV antibodies and seroconversion incidence in five haemodialysis units in Morocco]. *Nephrol Ther* 2008; **4**(2): 105-110 [PMID: 18272446 DOI: S1769-7255(07)00299-4 [pii]

10.1016/j.nephro.2007.11.007]

~~325~~326 El Khorassani M, Kababri M, Hessissen L, Khattab M, Kili A. Hemophilia in Morocco: Current state and prospects. *Haemophilia* 2010; **16**: 61 [PMID: 70225085 DOI: http://dx.doi.org/10.1111/j.1365-2516.2010.02283.x]

~~326~~327 Bousfiha AA, Hachim J, Benjelloun S, Benslimane A, Mikou N, Hadj Khalifa H. Prevalence of infection with the hepatitis B and C viruses and the human immunodeficiency virus in 39 Moroccan children with hemophilia. [French]

Prevalence des hepatites virales B et C et du VIH chez 39 enfants hemophiles Marocains. *Annales de Pediatrie* 1999; **46**(3): 199-204 [PMID: 1999103898]

~~327~~328 HIV Risk among Heroin and Injecting Drug Users in Muscat, Oman. Quantitative Survey. Preliminary Data. 2006

~~328~~329 Abdul Mujeeb S, Jamal Q, Khanani R, Iqbal N, Kaher S. Prevalence of hepatitis B surface antigen and HCV antibodies in hepatocellular carcinoma cases in Karachi, Pakistan. *Trop Doct* 1997; **27**(1): 45-46 [PMID: 9030022]

~~329~~330 Mujeeb SA, Khatri Y, Khanani R. Frequency of parenteral exposure and seroprevalence of HBV, HCV, and HIV among operation room personnel. *J Hosp Infect* 1998; **38**(2): 133-137 [PMID: 9522291~~]~~ DOI: http://dx.doi.org/10.1016/S0195-6701(98)90066-4]

~~330~~331 Aziz S, Memon A, Tily HI, Rasheed K, Jehangir K, Quraishy MS. Prevalence of HIV, hepatitis B and C amongst health workers of Civil Hospital Karachi. *J Pak Med Assoc* 2002; **52**(3): 92-94 [PMID: 12071075]

~~331~~332 Gul A, Iqbal F. Prevalence of hepatitis C in patients on maintenance haemodialysis. *J Coll Physicians Surg Pak* 2003; **13**(1): 15-18 [PMID: 12685968]

~~332~~333 Khan MS, Jamil M, Jan S, Zardad S, Sultan S, Sahibzada AS. Prevalence of hepatitis 'B' and 'C' in orthopaedics patients at Ayub Teaching Hospital Abbottabad. *J Ayub Med Coll Abbottabad* 2007; **19**(4): 82-84 [PMID: 18693606]

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333334 Kuo I, ul-Hasan S, Galai N, Thomas DL, Zafar T, Ahmed MA, Strathdee SA. High HCV seroprevalence and HIV drug use risk behaviors among injection drug users in Pakistan. *Harm Reduct J* 2006; **3**: 26 [PMID: 16914042] DOI: http://dx.doi.org/10.1186/1477-7517-3-26]

334335 United Nations Office for Drug Control and Crime Prevention and UNAIDS. Baseline Study of the Relationship between Injecting Drug Use, HIV and Hepatitis C among Male Injecting Drug Users in Lahore. 1999

335336 Achakzai M, Kassi M, Kasi PM. Seroprevalences and co-infections of HIV, hepatitis C virus and hepatitis B virus in injecting drug users in Quetta, Pakistan. *Trop Doct* 2007; **37**(1): 43-45 [PMID: 17326891] DOI: http://dx.doi.org/10.1258/004947507779951989]

336337 Pakistan National AIDS Control Programe. National Study of Reproductive Tract and Sexually Transmitted Infections. Survey of High Risk Groups in Lahore and Karachi. Ministry of Health, Pakistan. 2005

337338 Bhatti FA, Amin M, Saleem M. Prevalence of antibody to hepatitis C virus in Pakistani thalassaemics by particle agglutination test utilizing C 200 and C 22-3 viral antigen coated particles. *J Pak Med Assoc* 1995; **45**(10): 269-271 [PMID: 8714623]

338339 Akhtar S, Moatter T. Hepatitis C virus infection in polytransfused thalassemic children in Pakistan. *Indian Pediatr* 2004; **41**(10): 1072-1073 [PMID: 15523144]

339340 Rizvi TJ, Fatima H. Frequency of hepatitis C in obstetric cases. *J Coll Physicians Surg Pak* 2003; **13**(12): 688-690 [PMID: 15569552]

340341 Khan AJ, Luby SP, Fikree F, Karim A, Obaid S, Dellawala S, Mirza S, Malik T, Fisher-Hoch S, McCormick JB. Unsafe injections and the transmission of hepatitis B and C in a periurban community in Pakistan. *Bull World Health Organ* 2000; **78**(8): 956-963 [PMID: 10994278]

341342 Ali SS, Ali IS, Aamir AH, Jadoon Z, Inayatullah S. Frequency of hepatitis C infection in diabetic patients. *J Ayub Med Coll Abbottabad* 2007; **19**(1): 46-49 [PMID: 17867480]

342343 Abboud O, Rashid A, Al-Kaabi S. Hepatitis C virus infection in hemodialysis patients in qatar. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 151-153 [PMID: 18583855]

343344 Ayoola EA, al-Mofleh IA, al-Faleh FZ, al-Rashed R, Arif MA, Ramia S, Mayet I. Prevalence of antibodies to hepatitis C virus among Saudi patients with chronic liver diseases. *Hepatogastroenterology* 1992; **39**(4): 337-339 [PMID: 1385286]

344345 Khan ZA, Alkhalife IS, Fathalla SE. Prevalence of hepatitis C virus among bilharziasis patients. *Saudi Med J* 2004; **25**(2): 204-206 [PMID: 14968219]

345346 Qadi AA, Tamim H, Ameen G, Bu-Ali A, Al-Arrayed S, Fawaz NA, Almawi WY. Hepatitis B and hepatitis C virus prevalence among dialysis patients in

Bahrain and Saudi Arabia: a survey by serologic and molecular methods. *Am J Infect Control* 2004; **32**(8): 493-495 [PMID: 15573057] DOI: http://dx.doi.org/10.1016/j.ajic.2003.12.009]

346347 Karkar A. Hepatitis C in dialysis units: the Saudi experience. *Hemodial Int* 2007; **11**(3): 354-367 [PMID: 17576302] DOI: http://dx.doi.org/10.1111/j.1542-4758.2007.00192.x]

347348 Saxena AK, Panhotra BR. The vulnerability of middle-aged and elderly patients to hepatitis C virus infection in a high-prevalence hospital-based hemodialysis setting. *J Am Geriatr Soc* 2004; **52**(2): 242-246 [PMID: 14728634] DOI: http://dx.doi.org/10.1111/j.1532-5415.2004.52062.x]

348349 Huraib S, Al-Rashed R, Aldrees A, Aljefry M, Arif M, Al-Faleh FA. High prevalence of and risk factors for hepatitis C in haemodialysis patients in Saudi Arabia: A need for new dialysis strategies. *Nephrology Dialysis Transplantation* 1995; **10**(4): 470-474 [PMID: 1995142530]

349350 Souqiyyeh MZ, Shaheen FA, Huraib SO, Al-Khader AA. The annual incidence of seroconversion of antibodies to the hepatitis C virus in the hemodialysis population in saudi arabia. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 167-173 [PMID: 18583859]

350351 Shaheen FA, Huraib SO, Al-Rashed R, Aldrees A, Arif M, Al Jeffry M, Tashkandy MA, Safwat M. Prevalence of hepatitis C antibodies among hemodialysis patients in the Western province of saudi arabia. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 136-139 [PMID: 18583852]

351352 Omar MN, Tashkandy MA, El Tonsy AH. Liver enzymes and protein electrophoretic patterns in hemodialysis patients with antibodies against the hepatitis C virus. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 163-166 [PMID: 18583858]

352353 Ahmad MS, Mahtab AM, Abdullatif AS, Tashkandy MA, Kashreed MS, Maulana A. Prevalence of antibodies against the hepatitis C virus among voluntary blood donors at a makkah hospital. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 122-124 [PMID: 18583848]

353354 Njoh J, Zimmo S. Prevalence of antibodies to hepatitis C virus in drug-dependent patients in Jeddah, Saudi Arabia. *East African Medical Journal* 1997; **74**(2): 89-91 [PMID: 1997300211]

354355 Shobokshi OA, Serebour FE, Al-Drees AZ, Mitwalli AH, Qahtani A, Skakni LI. Hepatitis C virus seroprevalence rate among Saudis. *Saudi Medical Journal* 2003; **24**(SUPPL. 2): S81-S86 [PMID: 2003384776]

355356 Zaher G, Adam S. Outcomes of congenital bleeding disorders. *Bahrain Medical Bulletin* 2012; **34**(2) [PMID: 2012354081]

356357 Al-Hawsawi ZM. Prevalence of hepatitis C virus antibody [1]. *Annals of Saudi Medicine* 2000; **20**(5-6): 488-489 [PMID: 2001324979]

~~357~~358 al-Fawaz I, al-Rasheed S, al-Mugeiren M, al-Salloum A, al-Sohaibani M, Ramia S. Hepatitis E virus infection in patients from Saudi Arabia with sickle cell anaemia and beta-thalassemia major: possible transmission by blood transfusion. *Journal of Viral Hepatitis* 1996; **3**(4): 203-205 [PMID: 8871882~~]~~ DOI: http://dx.doi.org/10.1111/j.1365-2893.1996.tb00096.x]

~~358~~359 Al-Fawaz I, Ramia S. Decline in hepatitis B infection in sickle cell anaemia and beta thalassaemia major. *Archives of Disease in Childhood* 1993; **69**(5): 594-596 [PMID: 1993355872~~]~~ DOI: http://dx.doi.org/10.1136/adc.69.5.594]

~~359~~360 Harakati MS, Abualkhair OA, Al-Knawy BA. Hepatitis C Virus infection in Saudi Arab patients with B-cell non-Hodgkin's lymphoma. *Saudi Med J* 2000; **21**(8): 755-758 [PMID: 11423889]

~~360~~361 Watts DM, Corwin AL, Omar MA, Hyams KC. Low risk of sexual transmission of hepatitis C virus in Somalia. *Trans R Soc Trop Med Hyg* 1994; **88**(1): 55-56 [PMID: 8154002~~]~~ DOI: http://dx.doi.org/10.1016/0035-9203(94)90495-2]

~~361~~362 El-Amin HH, Osman EM, Mekki MO, Abdelraheem MB, Ismail MO, Yousif ME, Abass AM, El-haj HS, Ammar HK. Hepatitis C virus infection in hemodialysis patients in Sudan: two centers' report. *Saudi J Kidney Dis Transpl* 2007; **18**(1): 101-106 [PMID: 17237901]

~~362~~363 Kose S, Gurkan A, Akman F, Kelesoglu M, Uner U. Treatment of hepatitis C in hemodialysis patients using pegylated interferon alpha-2a in Turkey. *J Gastroenterol* 2009; **44**(4): 353-358 [PMID: 19277451 DOI: 10.1007/s00535-009-0016-z]

~~363~~364 Ati HA. HIV/AIDS/STIs Social and Geographical Mapping of Prisoners, Tea Sellers and Commercial Sex Workers in Port Sudan Town, Red Sea State. Ockenden International, Sudan. Draft 2. 2005

~~364~~365 Mudawi HM, Smith HM, Rahoud SA, Fletcher IA, Babikir AM, Saeed OK, Fedail SS. Epidemiology of HCV infection in Gezira state of central Sudan. *J Med Virol* 2007; **79**(4): 383-385 [PMID: 17311341]

~~365~~366 Othman BM, Monem FS. Prevalence of hepatitis C virus antibodies among health care workers in Damascus, Syria. *Saudi Med J* 2001; **22**(7): 603-605 [PMID: 11479642~~]~~ DOI: http://dx.doi.org/10.1002/jmv.20780]

~~366~~367 Moukeh G, Yacoub R, Fahdi F, Rastam S, Albitar S. Epidemiology of hemodialysis patients in Aleppo city. *Saudi J Kidney Dis Transpl* 2009; **20**(1): 140-146 [PMID: 19112237]

~~367~~368 Kaabia N, Ben Jazia E, Slim I, Fodha I, Hachfi W, Gaha R, Khalifa M, Hadj Kilani A, Trabelsi H, Abdelaziz A, Bahri F, Letaief A. Association of hepatitis C virus infection and diabetes in central Tunisia. *World journal of gastroenterology : WJG* 2009; **15**(22): 2778-2781 [PMID: 19522029 PMCID: 2695894~~]~~ DOI: http://dx.doi.org/10.3748/wjg.15.2778]

~~368~~369 Kaabia N, Ben Jazia E, Hannachi N, Khalifa M, Dhouibi S, Dabbabi F, Boukadida J, Bahri F, Brahem A, Mrizak N, Letaief A. Prevalence of hepatitis C virus among health care workers in central Tunisia. [French]

Prevalence de l'hepatite virale C chez le personnel de sante au Centre tunisien. *Medecine et Maladies Infectieuses* 2009; **39**(1): 66-67 [PMID: 2009001047 DOI: http://dx.doi.org/10.1016/j.medmal.2008.10.007]

~~369~~370 Hmaied F, Ben Mamou M, Saune-Sandres K, Rostaing L, Slim A, Arrouji Z, Ben Redjeb S, Izopet J. Hepatitis C virus infection among dialysis patients in Tunisia: incidence and molecular evidence for nosocomial transmission. *Journal of medical virology* 2006; **78**(2): 185-191 [PMID: 16372289 DOI: 10.1002/jmv.20526]

~~370~~371 Hmida S, Mojaat N, Chaouchi E, Mahjoub T, Khlass B, Abid S, Boukef K. HCV antibodies in hemodialyzed patients in Tunisia. [French]

Anticorps anti-HCV chez les hemodialyses en Tunisie. *Pathologie-biologie* 1995; **43**(7): 581-583 [PMID: 8570261]

~~371~~372 Jemni S, Ikbel K, Kortas M, Mahjoub J, Ghachem L, Bidet JM, Boukef K. Seropositivity to hepatitis C virus in Tunisian haemodialysis patients. *Nouvelle revue francaise d'hematologie* 1994; **36**(5): 349-351 [PMID: 7534398]

~~372~~373 Sassi F, Gorgi Y, Ayed K, Abdallah TB, Lamouchi A, Maiz HB. Hepatitis C virus antibodies in dialysis patients in Tunisia: a single center study. *Saudi journal of kidney diseases and transplantation : an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia* 2000; **11**(2): 218-222 [PMID: 18209319]

~~373~~374 Kilani B, Ammari L, Marrakchi C, Letaief A, Chakroun M, Ben Jemaa M, Ben Aissa HT, Kanoun F, Ben Chaabene T. Seroepidemiology of HCV-HIV coinfection in Tunisia. *Tunis Med* 2007; **85**(2): 121-123 [PMID: 17665657]

~~374~~375 Hannachi N, Boughammoura L, Marzouk M, Tfifha M, Khlif A, Soussi S, Skouri H, Boukadida J. Viral infection risk in polytransfused adults: Seroprevalence of seven viruses in central Tunisia. [French]

Le risque infectieux viral chez le polytransfuse: Seroprevalence de sept agents viraux dans le centre tunisien. *Bulletin de la Societe de Pathologie Exotique* 2011; **104**(3): 220-225 [PMID: 21695497 DOI: http://dx.doi.org/10.1007/s13149-010-0103-7]

~~375~~376 Djebbi A, Bahri O, Langar H, Sadraoui A, Mejri S, Triki H. Genetic variability of genotype 1 hepatitis C virus isolates from Tunisian haemophiliacs. *The new microbiologica* 2008; **31**(4): 473-480 [PMID: 19123302]

~~376~~377 Langar H, Triki H, Gouider E, Bahri O, Djebbi A, Sadraoui A, Hafsia A, Hafsia R. Blood-transmitted viral infections among haemophiliacs in Tunisia. [French]

Infections par des virus transmissibles par le sang chez des hemophiles en Tunisie. *Transfusion Clinique et Biologique* 2005; **12**(4): 301-305 [PMID: 2005445805 DOI: http://dx.doi.org/10.1016/j.tracli.2005.07.001]

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带格式的：无下划线，字体颜色：自动设置

377378 Kocabas E, Aksaray N, Alhan E, Tanyeli A, Koksal F, Yarkin F. Hepatitis B and C virus infections in Turkish children with cancer. *Eur J Epidemiol* 1997; **13**(8): 869-873 [PMID: 9476814] DOI: http://dx.doi.org/10.1023/A:1007420725704]

378379 Kebudi R, Ayan I, Yilmaz G, Akici F, Gorgun O, Badur S. Seroprevalence of hepatitis B, hepatitis C, and human immunodeficiency virus infections in children with cancer at diagnosis and following therapy in Turkey. *Med Pediatr Oncol* 2000; **34**(2): 102-105 [PMID: 10657869] DOI: http://dx.doi.org/10.1002/(SICI)1096-911X(200002)34:2<102::AID-MPO5>3.0.CO;2-#]

379380 Sonmez M, Bektas O, Yilmaz M, Durmus A, Akdogan E, Topbas M, Erturk M, Ovali E, Omay SB. The relation of lymphoma and hepatitis B virus/hepatitis C virus infections in the region of East Black Sea, Turkey. *Tumori* 2007; **93**(6): 536-539 [PMID: 18338485]

380381 Ocak S, Duran N, Kaya H, Emir I. Seroprevalence of hepatitis C in patients with type 2 diabetes mellitus and non-diabetic on haemodialysis. *Int J Clin Pract* 2006; **60**(6): 670-674 [PMID: 16805751] DOI: http://dx.doi.org/10.1111/j.1368-5031.2006.00738.x]

381382 Gul U, Kilic A, Sakizligil B, Aksaray S, Bilgili S, Demirel O, Erinckan C. Magnitude of sexually transmitted infections among female sex workers in Turkey. *J Eur Acad Dermatol Venereol* 2008; **22**(9): 1123-1124 [PMID: 18194239 DOI: JDV2548 [pii]

10.1111/j.1468-3083.2007.02548.x]

382383 Koksal I, Biberoglu K, Biberoglu S, Koc F, Ayma Y, Aker F, Koksal H. Hepatitis C virus antibodies among risk groups in Turkey. *Infection* 1991; **19**(4): 228-229 [PMID: 1917033] DOI: http://dx.doi.org/10.1007/BF01644950]

383384 Selcuk H, Kanbay M, Korkmaz M, Gur G, Akcay A, Arslan H, Ozdemir N, Yilmaz U, Boyacioglu S. Distribution of HCV genotypes in patients with end-stage renal disease according to type of dialysis treatment. *Dig Dis Sci* 2006; **51**(8): 1420-1425 [PMID: 16868830] DOI: http://dx.doi.org/10.1007/s10620-005-9025-9]

384385 Yakaryilmaz F, Gurbuz OA, Guliter S, Mert A, Songur Y, Karakan T, Keles H. Prevalence of occult hepatitis B and hepatitis C virus infections in Turkish hemodialysis patients. *Ren Fail* 2006; **28**(8): 729-735 [PMID: 17162434] DOI: http://dx.doi.org/10.1080/08860220600925602]

385386 Bozdayi G, Rota S, Verdi H, Derici U, Sindel S, Bali M, Basay T. [The presence of hepatitis C virus (HCV) infection in hemodialysis patients and determination of HCV genotype distribution]. *Mikrobiyol Bul* 2002; **36**(3-4): 291-300 [PMID: 12838663]

386387 Sit D, Kadiroglu AK, Kayabasi H, Yilmaz ME, Goral V. Seroprevalence of hepatitis B and C viruses in patients with chronic kidney disease in the predialysis stage at a university hospital in Turkey. *Intervirology* 2007; **50**(2): 133-137 [PMID: 17191015] DOI: http://dx.doi.org/10.1159/000098239]

~~387~~388 Kocabas E, Aksaray N, Alhan E, Yarkin F, Koksal F, Kilinc Y. Hepatitis B and C virus infections in Turkish children with haemophilia. *Acta Paediatr* 1997; **86**(10): 1135-1137 [PMID: 9350900~~]~~ DOI: http://dx.doi.org/10.1111/j.1651-2227.1997.tb14824.x~~]~~

~~388~~389 El Shahat YI, Varma S, Bari MZ, Shah Nawaz M, Abdulrahman S, Pingle A. Hepatitis C virus infection among dialysis patients in United arab emirates. *Saudi J Kidney Dis Transpl* 1995; **6**(2): 157-162 [PMID: 18583857]

~~389~~390 Trad O, Hayek M, Jumaa P, Trad D, Uduman S. Seroprevalence of hepatitis B, hepatitis C and HIV among multiply transfused thalassemic children treated at Tawam Hospital. *Emirates Medical Journal* 2003; **21**(1): 17-20 [PMID: 2003448533]

~~390~~391 Shidrawi R, Ali Al-Huraibi M, Ahmad Al-Haimi M, Dayton R, Murray-Lyon IM. Seroprevalence of markers of viral hepatitis in Yemeni healthcare workers. *J Med Virol* 2004; **73**(4): 562-565 [PMID: 15221900~~]~~ DOI: http://dx.doi.org/10.1002/jmv.20126~~]~~

~~391~~392 Watts DM, Constantine NT, Sheba MF, Kamal M, Callahan JD, Kilpatrick ME. Prevalence of HIV infection and AIDS in Egypt over four years of surveillance (1986-1990). *J Trop Med Hyg* 1993; **96**(2): 113-117 [PMID: 8459484]

~~392~~393 El-Shabrawi MH, Zein El Abedin MY, Omar N, Kamal NM, Elmakarem SA, Khattab S, El-Sayed HM, El-Hennawy A, Ali AS. Predictive accuracy of serum hyaluronic acid as a non-invasive marker of fibrosis in a cohort of multi-transfused Egyptian children with beta-thalassaemia major. *Arab journal of gastroenterology : the official publication of the Pan-Arab Association of Gastroenterology* 2012; **13**(2): 45-48 [PMID: 22980590 DOI: 10.1016/j.ajg.2012.06.006]

~~393~~394 Abdelwahab MS, El-Raziky MS, Kaddah NA, Abou-Elew HH. Prevalence of hepatitis C virus infection and human immunodeficiency virus in a cohort of Egyptian hemophiliac children. *Annals of Saudi medicine* 2012; **32**(2): 200-202 [PMID: 22366833]

~~394~~395 Marcelin AG, Grandadam M, Flandre P, Nicand E, Milliancourt C, Koeck JL, Philippon M, Teyssou R, Agut H, Dupin N, Calvez V. Kaposi's sarcoma herpesvirus and HIV-1 seroprevalences in prostitutes in Djibouti. *J Med Virol* 2002; **68**(2): 164-167 [PMID: 12210403~~]~~ DOI: http://dx.doi.org/10.1002/jmv.10184~~]~~

~~395~~396 Mokhbat JE, Naman RE, Rahme FS, Farah AE, Zahar KL, Maalouf A. Clinical and serological study of the human immunodeficiency virus infection in a cohort of multitransfused persons. *J Med Liban* 1989; **38**(1): 9-14 [PMID: 2519339]

~~396~~397 Mujeeb SA, Hafeez A. Prevalence and pattern of HIV infection in Karachi. *J Pak Med Assoc* 1993; **43**(1): 2-4 [PMID: 8474215]

~~397~~398 Novelli VM, Mostafavipour H, Abulaban M, Ekteish F, Milder J, Azadeh B. High prevalence of human immunodeficiency virus infection in children with thalassemia exposed to blood imported from the United States. *Pediatr Infect Dis J* 1987;

6(8): 765-766 [PMID: 3670941~~]~~ DOI: http://dx.doi.org/10.1097/00006454-198708000-00019]

~~398~~399 El-Hazmi MA, Ramia S. Frequencies of hepatitis B, delta and human immune deficiency virus markers in multitransfused Saudi patients with thalassaemia and sickle-cell disease. *J Trop Med Hyg* 1989; **92**(1): 1-5 [PMID: 2918572]

~~399~~400 Bakir TMF, Kurbaan KM, Fawaz IA, Ramia S. Infection with Hepatitis Viruses (B and C) and Human Retro viruses (HTLV-1 and HIV) in Saudi Children Receiving Cycled Cancer Chemotherapy. *Journal of Tropical Pediatrics* 1995; **41**(4): 206-209 [DOI: http://dx.doi.org/10.1093/tropej/41.4.206]

~~400~~401 Al Saran K, Sabry A, Hassan AH, Al Halawany Z. Evaluation of quality of care in a large Saudi Hemodialysis Center (Prince Salman Center for Kidney Diseases, Riyadh, KSA). *Renal failure* 2011; **33**(6): 555-561 [PMID: 21663385 DOI: 10.3109/0886022x.2011.581402]

~~401~~402 Hmida S, Mojaat N, Chaouchi E, Mahjoub T, Khlass B, Abid S, Boukef K. [HCV antibodies in hemodialyzed patients in Tunisia]. *Pathol Biol (Paris)* 1995; **43**(7): 581-583 [PMID: 8570261]

~~402~~403 Langar H, Triki H, Gouider E, Bahri O, Djebbi A, Sadraoui A, Hafsia A, Hafsia R. Blood-transmitted viral infections among haemophiliacs in Tunisia. *Transfusion clinique et biologique* 2005; **12**(4): 301-305 [PMID: 16099190 DOI: http://dx.doi.org/10.1016/j.tracli.2005.07.001]

Table 1. Hepatitis C virus prevalence among general population groups in the Middle East and North Africa.

Country	Population	~~Prevalence~~Seroprevalence (%)	References
Afghanistan	Blood donors	0.3-1.9	~~[125, 126]~~[126, 127]
	Pregnant women	0.31	~~[127]~~[128]
Algeria	Blood donors	0.18	~~[128]~~[129]
	Pregnant women	0.19-0.63	~~[128, 129]~~[129, 130]
Bahrain	Blood donors	0.3	~~[130]~~[131]
Djibouti	Blood donors	0.3	~~[131]~~[132]
Egypt	Army recruits	22.1	~~[132]~~[133]
	Blood donors	2.7-26.6	[104, ~~133-142~~134-143]
	Children	2.1-12.1	~~[85~~[85, 95, 104, ~~143-145~~]144-146]
	Family of HCV positive patients	0-14	~~[146]~~[147]
	Fire brigade personnel	39	[104]
	General population	10-41.9	[92, ~~147~~148, ~~148~~149]
	Healthy populations	5-46.7	[96, ~~149-153~~150-154]
	National survey	14.7	[62]
	Pregnant	4.3-19	~~[154-157]~~[155-158]

Country	Population	~~Prevalence~~Seroprevalence (%)	References
	women		
	Rural populations	2.7-60	~~[158-162]~~[159-163]
	Tourism workers	14.3	~~[163]~~[164]
	Visa applicants	31.5	~~[164]~~[165]
Iran	Blood donors	0.1-2.1	~~[114, 165-171]~~[115, 166-172]
	Children	0-0.6	~~[172, 173]~~[173, 174]
	Family of HCV positive patients	1.3	~~[174]~~[175]
	General population	0.1-3.1	~~[175]~~[176]
	Healthy populations	12.3	~~[176]~~[177]
Iraq	Pregnant women	3.2	~~[177]~~[178]
Kuwait	Blood donors	0.8-5.4	~~[178]~~[179]
	Outpatients	1	~~[179]~~[180]
Lebanon	Blood donors	0.4-0.7	~~[180-183]~~[181-184]
	General population	0.7	~~[184]~~[185]
Libya	Blood donors	0.9-6.6	~~[185-188]~~[186-189]
	Healthy populations	1.6-7.9	~~[185, 187]~~[186, 188]

Country	Population	~~Prevalence~~Seroprevalence (%)	References
	National survey	1.2	~~[189]~~[190]
Morocco	Blood donors	0.2-1.1	~~[190-193]~~[191-194]
	Pregnant women	0.5-1	~~[190, 194]~~[191, 195]
Oman	Blood donors	0.4-1.5	~~[195-199]~~[196-200]
Pakistan	Blood donors	0.5-16	[64, 77, ~~200-207~~]201-208]
	Children	1.7-2.1	[76, 77]
	Family of HCV positive patients	0.4-20.5	~~[208-210]~~[209-211]
	General population	4.7-5.4	[64, 77]
	Healthy adults	3	[77]
	Rural populations	4.6-33.7	[66, 67, ~~123, 211, 212~~]124, 212, 213]
	Vaccinated population with smallpox	21	[67]
	Women	6.7	~~[211]~~[212]
Palestine	General population	2.2	~~[147]~~[148]
Qatar	Blood donors	0.4-2.8	~~[213, 214]~~[214, 215]
	General	0.9	~~[215]~~[216]

Country	Population	~~Prevalence~~Seroprevalence (%)	References
	population		
Saudi Arabia	Blood donors	0.4-4.6	[73, ~~216-224~~217-225]
	Children	0.1-1.8	[71-73]
	General population	1.7-3.6	~~[225, 226]~~[226, 227]
	Outpatients	2.1-22.5	~~[227]~~[228]
	Pregnant women	0.1-4.6	[73, ~~228~~229, ~~229~~230]
	Subjects tested for HCV	5.1	~~[230]~~[231]
Somalia	Blood donors	0.6	~~[231]~~[232]
	Blood donors and hospitalized populations	2.4	~~[231]~~[232]
	Children	0-1.5	[74, 75]
	Healthy populations	1-6.5	[74, ~~232~~233]
Sudan	Outpatients	3	~~[233]~~ [234]
	Pregnant women	0.6	~~[234]~~ [235]
Syria	Blood donors	0.95	~~[235]~~ [236]
Tunisia	Blood donors	0.6-1.1	~~[236, 237]~~[237, 238]
	General population	0.2-1.7	~~[238-240]~~[239-241]

Country	Population	~~Prevalence~~Seroprevalence (%)	References
Turkey	Blood donors	0.2-0.4	~~[241-246]~~[242-247]
	Controls	1.3	~~[247]~~[248]
	Engaged couples	0.1	~~[248]~~[249]
	Family of HCV positive patients	2	~~[249]~~[250]
	General population	0.6-2.3	~~[248, 250, 251]~~[249, 251, 252]
	Obstetrics and gynecology patients	0.9	~~[252]~~[253]
	Outpatients	2.2	~~[253]~~[254]
	Rural populations	1	~~[254]~~[255]
	Soldiers	0.5-0.6	~~[244]~~[245]
UAE	Blood donors	0.5-1.10	~~[255, 256]~~[256, 257]
	College students	0-0.4	~~[257, 258]~~[258, 259]
Yemen	Blood donors	1.1	~~[259]~~[260]
	Healthy populations	2.1-4.2	~~[260, 261]~~[261, 262]

*Note: results shown are not of an exhaustive and systematic literature review.

Table 2. Hepatitis C virus (HCV) prevalence among different populations at higher risk of HCV infection in the Middle East and North Africa.

Country	Population	~~Prevalence~~Seroprevalence (%)	References
Afghanistan	People who inject drugs	36.6	~~[262]~~[263]
Algeria	Multi-transfused patients	30	[87]
Bahrain	Hemodialysis patients	7.4-9.24	~~[130, 263]~~[131, 264]
	Multi-transfused patients	40	~~[264]~~[265]
Egypt	Children with hepatosplenomegaly	16.4	~~[132]~~[133]
	Chronic liver disease patients	46.2-73.5	~~[132, 265]~~[133, 266]
	Hepatocellular carcinoma patients	78.5-84	~~[150, 266]~~[151, 267]
	Healthcare workers	1.4-7.7	~~[139, 267]~~[140, 268]
	Hemodialysis patients	46.2-100	~~[132, 139, 145, 268-270]~~[133, 140, 146, 269-271]
	People who inject drugs	63	~~[148, 271]~~[149, 272]
	Jaundice patients	27.3	~~[272]~~[273]
	Kidney transplant patients	23.3	~~[273]~~[274]
	Multi-transfused	11.1-81.6	[~~85~~85, 104, ~~132~~133, ~~139~~140,

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Country	Population	~~Prevalence~~Seroprevalence (%)	References
	patients		~~274-278~~275-279]
	Prisoners	31.4	[104]
	Sexually transmitted infections patients	5.3	~~[279]~~[280]
Iran	Female sex workers	2.7	~~[280]~~[281]
	Hepatitis B virus patients	12.3	~~[281]~~[282]
	Hemodialysis patients	2.9-55.9	~~[165, 282-286]~~[166, 283-287]
	HIV positive patients	11.5	~~[287]~~[288]
	Multi-transfused patients	5.1-71.3	[44, ~~113, 165~~114, ~~166~~166, 167, ~~173~~174, ~~284~~285, ~~288-300~~289-301]
	Injecting and non-injecting drug users	7.4-80	[105, 106, ~~169, 285, 301-306~~]170, 286, 302-307]
	Prisoners	30-78	[105, 106, ~~304, 307, 308~~]305, 308, 309]
Iraq	HIV positive patients	66	~~[309]~~[310]
	Multi-transfused patients	67.3	~~[310]~~[311]
Jordan	Multi-transfused patients	40.5	~~[311]~~[312]
Kuwait	Hemodialysis	27-40	~~[312-314]~~[313-315]

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Country	Population	~~Prevalence~~Seroprevalence (%)	References
	patients		
	Multi-transfused patients	33	~~[315]~~[316]
Lebanon	Healthcare workers	2.6	~~[316]~~[317]
	HIV positive patients	25	~~[317]~~[318]
Libya	Diabetics	24.4	~~[318]~~[319]
	Healthcare workers	2-6.8	~~[185, 187, 319]~~[186, 188, 320]
	Hemodialysis patients	20.5-42.5	~~[185, 320]~~[186, 321]
	Multi-transfused patients	10.8	~~[185]~~[186]
Morocco	Barbers	1.1-5	~~[100, 321]~~[100, 322]
	Hemodialysis patients	10.1-76	~~[190, 322-324]~~[191, 323-325]
	Multi-transfused patients	2.3-42.4	~~[190, 323, 325, 326]~~[191, 324, 326, 327]
Oman	Hemodialysis patients	26.5	~~[195]~~[196]
	People who inject drugs	11-53	~~[327]~~[328]
	Kidney transplant patients	13.4	~~[195]~~[196]
	Medical students	0	~~[195]~~[196]
Pakistan	HCC patients	33	~~[328]~~[329]

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Country	Population	~~Prevalence~~Seroprevalence (%)	References
	Healthcare workers	5.5-31	[77, ~~329~~330, ~~330~~331]
	Hemodialysis patients	68	[65, ~~331~~332]
	Hospital attendees	3.1	~~[332]~~[333]
	Injecting and non-injecting drug users	22-91	~~[333-336]~~[334-337]
	Multi-transfused patients	13.2-60.0	~~[337-339]~~[338-340]
	Patients receiving frequent injections	44	~~[340]~~[341]
	Type 2 diabetes patients	36	~~[341]~~[342]
Qatar	Hemodialysis patients	44.6	~~[342]~~[343]
Saudi Arabia	Cancer patients	11	[71]
	Chronic liver disease patients	63.6	~~[343]~~[344]
	Healthcare workers	2.2	~~[344]~~[345]
	Hemodialysis patients	6.9-84.6	[73, ~~216~~217, ~~225~~226, ~~345-352~~346-353]
	Injecting and non-injecting drug users	10.5-74.6	~~[226, 353, 354]~~[227, 354, 355]
	Multi-transfused patients	4.6-78.6	~~[228, 355-358]~~[229, 356-359]
	Non-Hodgkins lymphoma patients	21	~~[359]~~[360]

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Country	Population	~~Prevalence~~Seroprevalence (%)	References
	Schistosomiasis patients	17.9	~~[344]~~[345]
Somalia	Chronic liver disease patients	40.3	~~[232]~~[233]
	Female sex workers, sexually transmitted infection patients, soldiers, Tuberculosis patients	1.8	~~[360]~~[361]
	Hospitalized patients	2.2	[74]
Sudan	Hemodialysis patients	19-34	~~[361, 362]~~[362, 363]
	Hospital attendees	0.4	~~[363]~~[364]
	High schistosomiasis region	2.2	~~[364]~~[365]
Syria	Female sex workers	1.96	~~[235]~~[236]
	Healthcare workers	0-6	~~[365]~~[366]
	Hemodialysis patients	54.4	~~[366]~~[367]
	People who inject drugs	60.5	~~[235]~~[236]
Tunisia	Diabetics	1.3	~~[367]~~[368]

带格式表格

Country	Population	~~Prevalence~~Seroprevalence (%)	References
	Healthcare workers	1	~~[368]~~[369]
	Hemodialysis patients	20-46.5	~~[369-372]~~[370-373]
	HIV positive patients	39.7	~~[373]~~[374]
	Multi-transfused patients	42-50.5	~~[374-376]~~[375-377]
Turkey	Barbers	2.8	[101]
	Cancer patients	2.8-5.8	~~[377-379]~~[378-380]
	Diabetic patients	3.2-20.8	~~[247, 380]~~[248, 381]
	Female sex workers	0.8	~~[381]~~[382]
	Healthcare workers	0.3-1.5	~~[241, 382]~~[242, 383]
	Hemodialysis patients	0-51.2	~~[380, 382-385]~~[381, 383-386]
	Chronic kidney disease patients	7	~~[386]~~[387]
	Multi-transfused patients	4-24.4	~~[382, 387]~~[383, 388]
United Arab Emirates	Hemodialysis patients	24.4	~~[388]~~[389]
	Multi-transfused patients	18.8	~~[389]~~[390]
Yemen	Chronic liver disease patients	21.5-37.1	~~[260, 261]~~[261, 262]
	Healthcare workers	0.5-3.5	~~[259, 390]~~[260, 391]

*Note: results shown are not of an exhaustive and systematic literature review.

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Table 3. HIV prevalence among high risk HIV parenteral-transmission population groups in the Middle East and North Africa (other than people who inject drugs).

Country	Population	~~Prevalence~~Seroprevalence (%)	References
Bahrain	Children with hereditary hemolytic anemia	1.6	~~[264]~~[265]
Egypt	Blood or blood products recipients	4.8	~~[391]~~[392]
	Thalassemia patients	0	~~[392]~~[393]
	Children with hemophilia	0	~~[393]~~[394]
Iran	Thalassemia patients	0	[44~~, 113, 165, 173, 284, 291, 295-298, 394~~], 114, 166, 174, 285, 292, 296-299, 395]
	Hemophilia patients	0-2.3	~~[166, 284, 288-291, 294]~~[167, 285, 289-292, 295]
Jordan	Multi-transfused patients	0	~~[311]~~[312]
Lebanon	Multi-transfused patients	0	~~[395]~~[396]
Morocco	Hemodialysis patients	0	~~[323]~~[324]

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Country	Population	~~Prevalence~~Seroprevalence (%)	References
Pakistan	Multi-transfused patients	0.98	~~[396]~~[397]
	Hemodialysis patients	0.98	~~[284]~~[285]
Qatar	Children with thalassemia	38.5	~~[397]~~[398]
Saudi Arabia	Multi-transfused, thalassemia and sickle cell disease patients	1.3	~~[398]~~[399]
	Children undergoing cancer therapy	0	~~[399]~~[400]
	Hemodialysis patients	0	~~[400]~~[401]
Tunisia	Hemodialysis patients	0	~~[401]~~[402]
	Hemophiliacs	8.6	~~[402]~~[403]

*Note: results shown are not of an exhaustive and systematic literature review.

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