



Cost-effectiveness of EGCRISC application versus hepatitis C virus mass screening in Egypt

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ARTICLE INFO

Article history:

Received 16 February 2018

Accepted 25 August 2018

Keywords:

HCV
EGCRISC
Cost-effectiveness
Screening

ABSTRACT

Background: The Egyptian model of care against hepatitis C virus (HCV) has a great success in treatment and treatment accessibility, but still screening efforts must be strengthened. HCV is a silent infection when most of infected people are unaware of their infection. EGCRISC is a newly developed and validated risk-based HCV screening tool in Egypt that has shown a considerably good performance but is still underused. This brief communication is to analyze its use cost-effectiveness versus mass screening.

Study design: Mathematical comparative analysis for economic evaluation.

Methods: Its performance data as published recently were used, and a minimum cost of L.E. 20 was considered per one antibody testing. The 2015 health issue survey and population census were used for estimating the population, infected individuals and susceptibles.

Results: The analysis showed that using EGCRISC would save LE 0.43 billion accounting for about 21,646,227 unnecessary tests, while missing less than 70,000 cases when compared to mass screening.

Conclusion: EGCRISC is a cost-effective tool that must be adopted nationwide as soon as possible in Egypt for the best outcome of HCV control.

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Introduction

Since its emergence, hepatitis C virus (HCV) infection has always been a public health challenge in Egypt [1]. During the last few years, a global revolution in HCV treatment has occurred due to the use of the effective directly acting antiviral drugs (DAAs). Egyptian government succeeded to get the drug in a highly reduced price with a further reduction after local manufacturing. Egypt has a recognized and distinguished story of success in HCV management not only for the free provision of the drug, but also for the comprehensive model of care [2]. Nevertheless, elimination of HCV would have never been achieved without active screening and robust prevention measures. For reducing the rate of new infections, control of source and prevention of transmission are the key elements. Despite the fact that effective treatment is readily available for diagnosed cases, it was shown that the disease is diagnosed either accidentally or late during the liver insult phase of the disease [3]. According to a television interview with Professor Wahid Doss in 30 July 2017, he stated that till this time, 1,600,000 patients have been treated, but approxi-

mately 3000,000 are still looked for. Together with the evidence of ongoing transmission [4], and the estimated basic reproduction number (R_0) of 3.54 (95% CI 1.28–6.18) [5], efforts to prevent HCV from being self-sustained are mandatory. Therefore, one important thing is that effective screening strategy must be adopted. Recently, the state has paid attention to this issue and started screening efforts through “Tahya Misr Fund” in conjunction with private sectors funds. There are many campaigns in some organizations, villages, health care workers, etc. From the author’s perspective, these efforts are random and lack a clear scientific basis. Unless there is the ability and feasibility to screen every citizen, a risk-based approach has to be followed. This strategy is well followed by both wealthy and less privileged countries in many infections including HCV. If every Egyptian citizen >15 years old is screened with a minimal cost L.E. 20/test, the total budget would exceed L.E. 1.2 billion. In U.S.A., CDC recommends HCV screening for baby boomers, persons who were born during 1945–1965 because they are 5 times more likely to have hepatitis C than other adults [6].

The Egyptian HCV risk score screening tool (EGCRISC) has been recently developed [7] and validated [8]. It showed a considerably good performance when applied in a large cross-sectional study involving many governorates in Egypt with variable settings [9].

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Methods

Study design

Mathematical comparative analysis for economic evaluation.

In an attempt to analyze the cost-effectiveness of EGCRISC use versus mass screening, we used its performance data as published recently [9]. We considered that people who would get results that lie either in the yellow zone (intermediate risk score) and red zone (high risk score) would get tested for HCV antibodies, while those whose scores indicate low risk (green zone) would be spared. The population included in this analysis are those who are at least 15 years old according to the population census of January 2015 categorized by gender and age in years (<45 and 45+). The estimated number of chronic HCV patients was according to 2015 EHS (Egypt Health Issues Survey) [10]. The cost of HCV antibodies ELISA testing was considered L.E. 20. This cost was multiplied by the number of targeted population in both strategies (EGCRISC and mass screening) for comparative reasons. The cost differences were calculated by simple subtraction. Missing HCV positive cases in case of application of EGCRISC are the number of HCV-Ab positive individuals who appear in the green zone if EGCRISC was applied. The cost of needless to screen in mass screening was calculated by multiplying the assumed test cost by the estimated number of HCV-Ab negative individuals.

Results

The cost analysis of EGCRISC use as a screening tool versus mass screening is illustrated in Table 1. It shows that, applying EGCRISC instead of mass screening would save at least LE 0.43 billion accounting for about 21,646,227 unnecessary tests (35.8% of the targeted population) and would only miss about 69,660 cases.

This analysis intentionally underestimated the actual cost of HCV ELISA antibody testing that reaches LE 120–180 in most commercial laboratories in Egypt, assuming that the government may reach this price in terms of the huge purchase for mass screening. This analysis also used the population census of January 2015 and did not consider the population growth. Moreover, other logistics costs and qualitative values were not considered making the conclusion the least benefit that would be gained when EGCRISC is applied.

Implications for policy & practice

EGCRISC is a cost-effective tool and giving its previous validation and performance evidences, it must be nationwide adopted for a much lower cost and effective HCV screening and consequently better control of HCV in Egypt. Universal nationwide use of EGCRISC would save A MINIMUM OF LE 0.43 billion accounting for about 21,646,227 unnecessary tests, while missing less than 70,000 cases when compared to mass screening.

Author statements

This study was approved by the High Institute of Public Health ethics committee. The analysis was not based on human subjects, only anonymous data from previous studies were used versus assumed costs of laboratory analysis. The author has no funding or competing interests to declare.

Funding

No funding sources.

Table 1
EGCRISC cost effectiveness versus mass screening in the Egyptian population according to 2015 census.

Subject	Population JAN 2015	Estimated positive HCV no. ^b	Susceptible no.	EGCRISC zones ^a		Yellow/red (Y/R)		Red %+ve Ab	Cost of total screening by ELISA or RT (LE)	Cost of screening by EGCRISC (Y/R) (LE)	Cost difference	No. of missed cases in screening by EGCRISC	Cost of needless to screen in mass screening	
				Green	Needless to screen of total population (% -ve Ab)	Worth- screening of total population (%+ve Ab)	Worth- screening of total population (%+ve Ab)							Has to be screened (% lying in Y/R)
Male <45	21917741	1470924	20446817	48.3	0	21.4	100	438354820	227944506	210410314	211725378			
Male 45+	8724852	2296492	6428360	18.7	0	46.2	100	174497040	141342602	33154438	32630946			
Female <45	21114260	849340	20264920	27.3	0	11.3	100	422285200	308268196	114017004	115283860			
Female 45+	8707470	1869250	6838220	47.3	0.8	66.8	94.7	174149400	90557688	83591712	69659.76	82372666		
Total	60464323	6486006	53978317	35.8	0.4	32.02	432924553	432924553	432924553	432924553	432924553	432924553	432924553	

^a The EGCRISC performance is according to a recent estimate [9].

^b The number is estimated according to 2015 EHS [10].

Competing interests

None declared.

Ethical approval

Not required.

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