

Mass screening for hepatitis B and C in South Upper Egypt: lessons learned from a real life experience

Gamal Soliman¹, Mahmoud S. Elzalabany², Tarek Hassanein³ and F. DeWolfe Miller⁴

1. Faculty of Medicine, Al-Azhar University, Tropical medicine, gastroenterology and hepatology department, Cairo, Egypt

2. Ahmed Maher Teaching Hospital, Internal Medicine Department, Cairo, Egypt

3. Southern California Liver Centers, Coronado, CA, United States 4. John A. Burns School of Medicine, University of Hawaii, Honolulu, HI, United States

INTRODUCTION

Egypt has the highest HCV prevalence in the world, estimated to be up to 10% in the last 2015 Egyptian Health Issues Survey (EHIS) [1]. This HCV epidemic has historic origins; many consider the cause to be parenteral anti-schistosomiasis therapy (PAT) campaigns, carried out by the health authorities in the nineteen sixties and seventies. In these campaigns, intravenous injection of tartar emetic was used to treat schistosomiasis. Glass syringes were reused and improperly sterilized resulting in mass transmission of hepatitis C virus [2]. More recent reports have shown large historic and concurrent iatrogenic exposures with ongoing iatrogenic transmission [3].

In an effort to control HCV infection, treatment centers were established across the country. The first center in Luxor was inaugurated in June 2016 and implemented a free screening program in South Upper Egypt (Luxor and Qena governorates), funded by Tahya Misr Fund, the Ministry of Health and local NGOs.

METHODS

Free screening for HCV and HBV was offered to individuals older than 16 years at Luxor HCV treatment Center. The center also started outreach screening campaigns in the towns and villages of Luxor and nearby governorates. Agreements were made with local NGOs to provide materials, personnel, and advertising for these campaigns. Demographic data and a blood specimen were collected from each participant. Sera were tested for HCV antibodies and HBsAg using third generation enzyme immunoassays (*Enzygnost® Anti-HCV and HBsAg, Siemens, Germany*). Patients positive for HCV antibodies were referred to treatment centers.

Between June 2016 and May 2017, 71,952 individuals were screened. We retrospectively analyzed the screening data. To provide a point of reference, we compared screening data to the estimates of EHIS 2015. EHIS did not test persons over 60 years of age.

RESULTS

At the time of this analysis, data was available for 67,042 participants. 31,965 males (47.7%) and 35,077 females (52.3%) were screened with a mean age of 43.6 ± 14.3 years. The age structure, in 5 year age groups, of the screening participants rises sharply from 18 years old to 30 years old and then decline gradually after 55 years old (**Figure 1**).

9701 patients (14.5%) were positive for HCV antibodies and 2947 (4.4%) for HBsAg. Prevalence of HCV antibodies was significantly higher in males than females (19.67% vs. 9.73% OR=2.27; CI 2.2 to 2.4; $p < 0.001$) and the same for HBsAg (6.2% vs. 2.8% OR=2.3; CI 2.2 to 2.5; $p < 0.001$) (**Table 1**).

The prevalence of HCV antibodies was significantly associated with age ($p < 0.001$) and ranged between 1-4% in individuals below the age of 40 years, then increased steadily until age 59 (41.6%). This pattern is consistent with the EHIS 2015 (**Figure 2**).

In contrast, HBsAg prevalence was lower than 2% in individuals younger than 25 years, and increased to 6% in the 25-44 years age group. Above 45 years of age the prevalence was 2-4% (**Figure 3**).

HCV/HBV co-infection was found in 0.16% of individuals (107/67,042). HBsAg was positive in 1.1% of HCV positive patients versus 5% in negative individuals.

Table (1): Prevalence of HCV antibodies and HBsAg in the screened population stratified by gender.

Anti-HCV Antibodies				
Gender	Positive	Negative	Total	Prevalence (%)
Female	3413	31664	35077	9.73
Male	6288	25677	31965	19.67
Total	9701	57341	67042	14.47
(OR for Male = 2.27; 95% CI 2.2 - 2.4; $p < 0.001$)				
HBsAg				
Gender	Positive	Negative	Total	Prevalence (%)
Female	965	34097	35062	2.75
Male	1982	29963	31945	6.20
Total	2947	64060	67007	4.40
(OR for Male = 2.34; 95% CI 2.2 - 2.5; $p < 0.001$)				

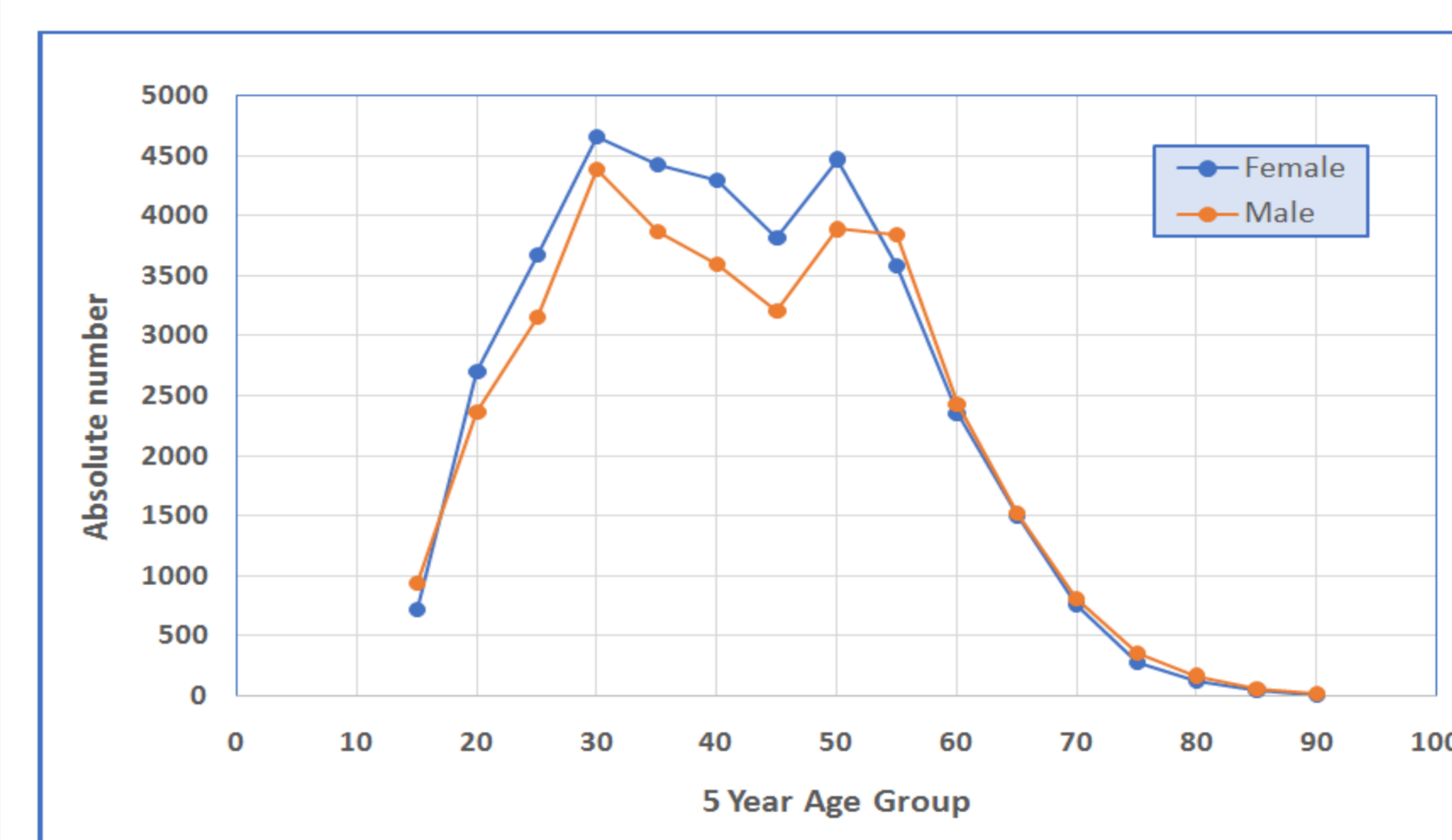


Figure (1): Absolute numbers of persons screened by 5 year age groups and gender.

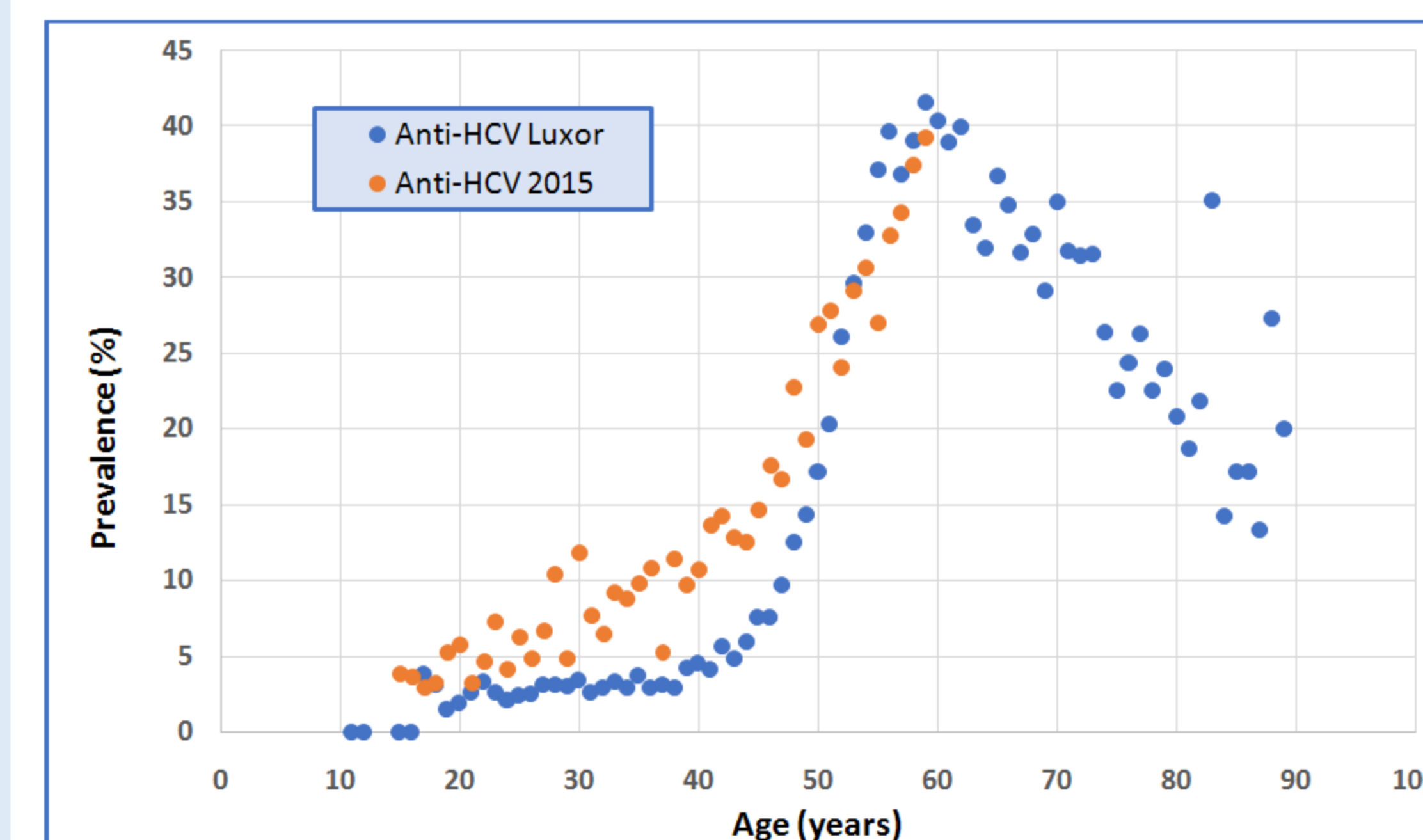


Figure (2): Comparison between Anti-HCV antibodies prevalence in the current study and the 2015 national estimate.

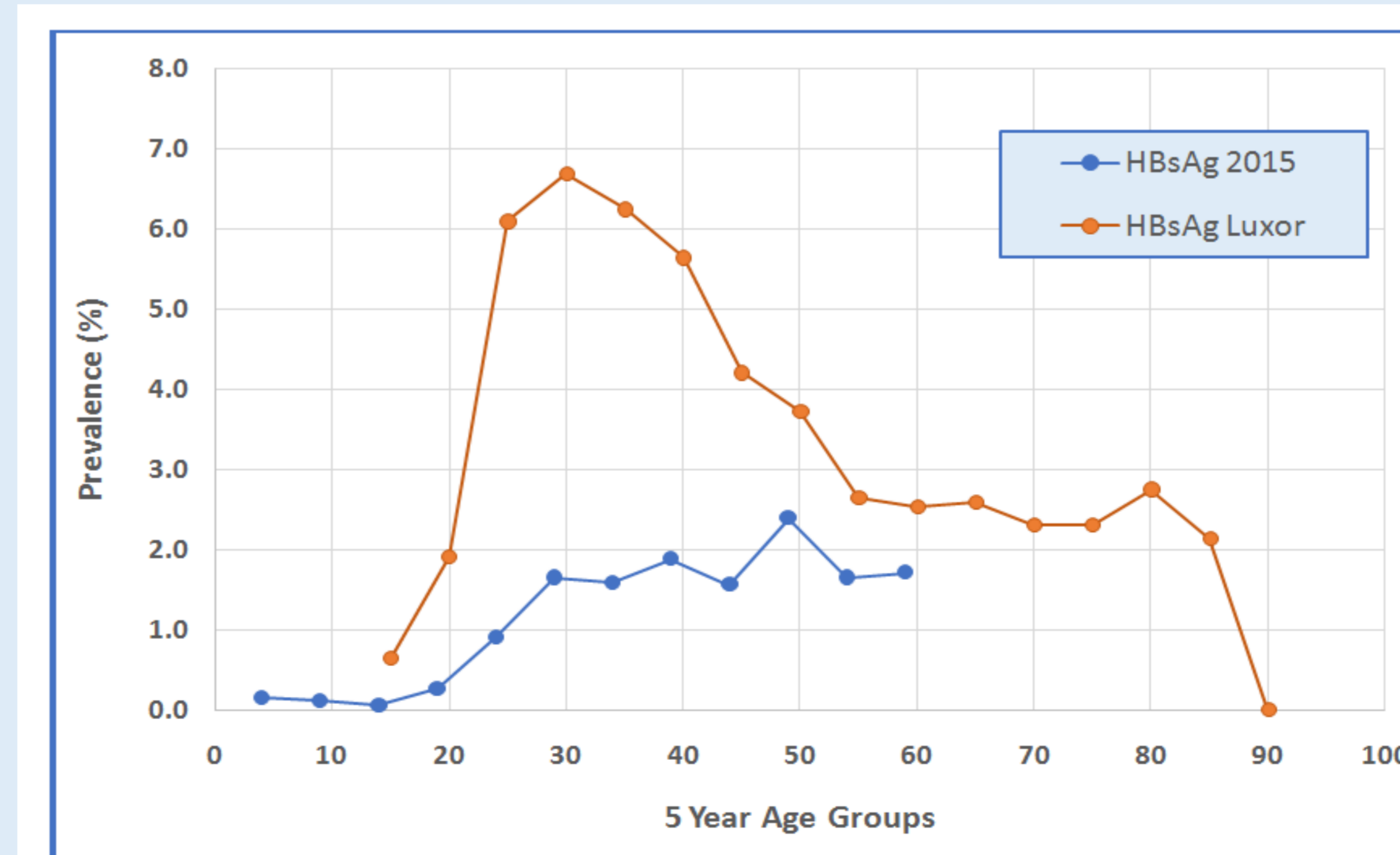


Figure (3): Comparison between HBsAg prevalence in the current study and the 2015 national estimate.

CONCLUSION

This screening program in South Upper Egypt rural areas showed:

- 1) A higher prevalence of HCV antibodies and HBsAg in South Upper Egypt (14.5% and 4.4%) than the general population estimated in the 2015 EHIS (10% and 1.5%).
- 2) The age stratified HCV antibodies prevalence shows a similarity between the current study and 2015 EHIS in the 15-59 years age groups. We recommend that further national surveys should include persons over the age of 60.
- 3) HCV prevalence was significantly higher in males and in patients older than 40 years. This should be taken into consideration when prioritizing screening efforts.
- 4) This new data underscores the importance of extending infection control efforts and screening to rural areas.
- 5) HBV vaccination policy in South Upper Egypt should be revised.

REFERENCES

1. El-Zanaty and Associates, ICF International, Egyptian Ministry of Health and Population. Egypt Health Issues Survey 2015. Cairo, Egypt: Egyptian Ministry of Health and Population and ICF International.
2. Frank C, Mohamed MK, Strickland GT, Lavanchy D et al. The role of parenteral antischistosomal therapy in the spread of hepatitis C virus in Egypt. *Lancet* 2000; 355: 887-891.
3. Miller FD, Elzalabany MS, Hussani S, Cuadros DF. Epidemiology of hepatitis C virus exposure in Egypt: Opportunities for prevention and evaluation. *World J Hepatol* 2015; 7: 2849-2858.

CONTACT INFORMATION

Mahmoud S. Elzalabany, MBCh, MSc.
Ahmed Maher Teaching Hospital,
Internal Medicine Department, Cairo, Egypt
Email: dr_msf@hotmail.com
Mobile: +2- 011-4490-1911

