HEPATITIS B VACCINATION RATE AND DETERMINANT FACTORS AMONGST HEALTH CARE WORKERS AT AGA KHAN UNIVERSITY HOSPITAL, NAIROBI

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STUDY JUSTIFICATION

- Hepatitis B virus infection is highly prevalent in Kenya. It results in acute and chronic hepatitis, hepatic failure, hepatocellular carcinoma and directly contributes to mortality both in its acute and chronic forms of infection.

- Because of its impact on health globally, efforts are geared towards prevention of HBV infection, especially in high-risk populations, including HCWs.
**STUDY JUSTIFICATION**

- Education and vaccination have been shown to have the greatest impact on reducing infection rates.
- Effective vaccination has been available for almost two decades now but the vaccine is still under-utilised.
- The absence of official government policy on vaccination of HCWs further compounds the problem of availability of vaccination services.
STUDY JUSTIFICATION

- Local studies in the public health sector have demonstrated knowledge deficits with regard to HBV, lack of official facilitation for vaccine provision and poor uptake when voluntary vaccination is offered (45).
STUDY JUSTIFICATION

- There is paucity of data on whether an official HBV vaccination policy and vaccine availability to the HCW in sub-Saharan Africa has any effect on improving the vaccination rates. This study attempts to answer these questions and further seeks to analyse the factors that determine whether the healthcare workers are vaccinated or not.

- Knowledge, attitude and practices, vaccination rates and determining factors were assessed and analysed. The resulting recommendations shall be made to the relevant public and private sector authorities.
Susceptibility of healthcare workers in Kenya to hepatitis B: new strategies for facilitating vaccination uptake

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**STUDY SETTING**

- The Aga Khan University Hospital-Nairobi, is a 254 bed not-for-profit tertiary hospital

- **815** HCWs with occupational risk of infection with hepatitis B virus (HBV).

- The hospital has a comprehensive HCW vaccination policy and vaccine available to HCWs as part of medical scheme.

- Implementation and monitoring by Staff Health co-ordinator and Human Resources department.
Research Question

- Does hepatitis B vaccination policy and vaccine provision influence the vaccination rates amongst HCWs in AKUHN?
GOAL OF STUDY

- Determine hepatitis B vaccination rates in the setting of a vaccination policy and vaccine availability on the in HCWs
**Null Hypothesis**

- Hepatitis B vaccination rates amongst health care workers are independent of Institutional or personal factors
OBJECTIVES

Primary Objectives
○ Determine vaccination rate amongst HCWs
○ Determine individual and non-individual factors that may influence vaccination

Secondary Objectives
○ Determine protective antibody titre levels in vaccinated HCWs*
○ Assess knowledge, attitude and practice towards HBV infection
METHODS

- Cross sectional analytical study
  - Study period January 2011 to May 2011
  - Computer-generated randomised stratified sampling of HCWs in departments
  - Informed consent
  - Inclusion and exclusion criteria applied
  - Questionnaire administered
  - Analysis
<table>
<thead>
<tr>
<th>Cadre of staff</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td></td>
</tr>
<tr>
<td>• Faculty</td>
<td>56</td>
</tr>
<tr>
<td>• Residents</td>
<td>71</td>
</tr>
<tr>
<td>• Senior house officers</td>
<td>48</td>
</tr>
<tr>
<td>• Interns</td>
<td>9</td>
</tr>
<tr>
<td>Nurses</td>
<td>360</td>
</tr>
<tr>
<td>Health care assistants</td>
<td>69</td>
</tr>
<tr>
<td>Cleaners</td>
<td>67</td>
</tr>
<tr>
<td>Radiographers</td>
<td>20</td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>15</td>
</tr>
<tr>
<td>Laboratory technologists</td>
<td>57</td>
</tr>
<tr>
<td>Phlebotomists</td>
<td>22</td>
</tr>
<tr>
<td>Anesthetic assistants and theatre attendants</td>
<td>21</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>815</strong></td>
</tr>
</tbody>
</table>
SAMPLE SIZE AND SAMPLE SIZE CALCULATION

- Stratified sampling was used due to the heterogeneity of HCWs

- A sample size of 261 allowed us to estimate the hepatitis B vaccination rate for HCWs at AKUHN with 95% confidence

- The estimated rate of Hepatitis B vaccination was 50% (94) and we hoped to establish this with ±5% error
SAMPLE SIZE AND SAMPLE SIZE CALCULATION

\[ n = \frac{Z^2 P(1-P)}{\delta^2} \]

- \( n \) = minimum sample size
- \( Z \) = \( Z \) statistic for 95% level of confidence (1.96)
- \( P \) = Estimated Hepatitis B vaccination rate (0.5)
- \( \delta \) = Precision with a 95% confidence interval which gives a margin of error of 0.05.

- Substituting for the variables:

\[ n = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2} \]

\[ n = 384 \]
SAMPLE SIZE AND SAMPLE SIZE CALCULATION

- Given that this sample size was more than 5% of the total population of HCWs, a finite population correction was done.

\[ n' = \frac{Z^2 P(1-P)}{\delta^2 (N-1) + Z^2 P (1-P)} \]

\[ n' = \text{Sample size with finite population correction} \]
\[ N = \text{Population size of interest which is 815} \]
\[ Z = Z \text{ statistic for 95% level of confidence (1.96)} \]
\[ P = \text{Estimated Hepatitis B vaccination rate (0.5)} \]
\[ \delta = \text{Precision with a 95% confidence interval which gives a margin of error of 0.05.} \]

- \[ n' = \frac{815 \times 1.96^2 \times 0.5(1-0.5)}{0.05^2(815-1) + 1.96^2 \times 0.5(1-0.5)} = \frac{782.726}{41.6604} \approx 261 \]
RESULTS

- Sample size 266
- Gender distribution

[Pie chart showing gender distribution with 58.60% Female and 41.40% Male]
## Population Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>22</td>
<td>59</td>
<td>33.88</td>
</tr>
<tr>
<td><strong>Number of years in position</strong></td>
<td>&lt;1</td>
<td>30</td>
<td>7.05</td>
</tr>
</tbody>
</table>
Distribution by Staff title

- Nurses: 43.60%
- Doctors: 21.90%
- Lab staff: 11.70%
- Cleaners: 8.60%
- HCAs: 7.90%
- Others: 6.30%
Distribution by Department

- **Medicine**: 23.70%
- **Surgery**: 16.90%
- **Pathology**: 15.80%
- **ICU/HDU**: 8.70%
- **Casualty/OPD**: 7.50%
- **Paediatrics**: 7.10%
- **Housekeeping**: 6.80%
- **Others**: 7.10%
Knowledge of Hepatitis B

- Yes: 95.50%
- No: 4.50%
Sources of information on Hepatitis B

- Education: 87.80%
- Colleagues
- Mass Media
- Other
HEPATITIS B VACCINATION RATE

- Fully Immunised: 56.02%
- Partially Immunised: 24.81%
- NOT Immunised: 19.17%
REASONS FOR NOT BEING VACCINATED

- Didn't know need for vaccination: 25%
- Didn't think was at risk for infection: 15%
- Concerned about side effects: 10%
- Concerned about cost: 5%
- No time: 0%
- No reason: 0%
- Others: 10%
ASSOCIATION BETWEEN KNOWLEDGE ON HEPATITIS B AND VACCINATION STATUS

- There is an association between knowledge of hepatitis B and vaccination, which is statistically significant (p=0.001)

Know what is Hepatitis B * Received vaccination against Hepatitis B Crosstabulation

<table>
<thead>
<tr>
<th>Know what is Hepatitis B</th>
<th>Received vaccination against Hepatitis B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>212</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>254</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>215</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>266</td>
</tr>
</tbody>
</table>
## Association between Knowledge on Hepatitis B and Vaccination Status

### Correlations

<table>
<thead>
<tr>
<th></th>
<th>Know what is Hepatitis B</th>
<th>Received vaccination against Hepatitis B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know what is Hepatitis B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>266</td>
<td>266</td>
</tr>
<tr>
<td>Pearson Correlati</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.308**</td>
</tr>
<tr>
<td></td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Received vaccination against Hepatitis B</td>
<td>.308**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>266</td>
<td>266</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**
### OCCUPATIONAL EXPOSURE TO HEPATITIS B INFECTION

<table>
<thead>
<tr>
<th></th>
<th>Number NSI last year</th>
<th>Number splash injuries per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute number</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Mean per HCW</td>
<td>0.1</td>
<td>0.09</td>
</tr>
</tbody>
</table>

0.97 NSIs per HCW in Thika district (2006)
DISCUSSION
**Vaccination Rate**

- Relatively low vaccination rate **56.02%**

- Better than a previous survey conducted in Thika district, Kenya (12.8%) ; just comparable to the rate found in HCWs in other developing countries (49-66%)

- Of note is that in the other studies, the vaccine was not readily available to the HCWs

- It would be expected that in the setting of ready vaccine availability, the vaccine coverage would be higher
VACCINATION RATE

- A comparable setting is the Aga Khan University Hospital, Karachi, (AKUHK) where 86% of the health care workers are completely immunised.

- The vaccination policies of the AKUHK and AKUHN are similar, hence the results are directly comparable and one would have expected almost similar results.
ORGANISATIONAL FACTORS

- Vaccination policy implementation
- HCW vaccination records
- ? High staff turnover
INDIVIDUAL FACTORS

- Staff cadre
- Attitude
- Lack of knowledge
RECOMMENDATIONS

- Immediate initiation of vaccination for the unvaccinated and completion for the partially vaccinated HCWs

- Cooperation between the staff health department and Infection control team to maintain a HCW vaccination schedule and records and offer continuous education on work related risks of infection

- Implementation and strengthening of the vaccination policy. This may include inclusion of hepatitis B education and other health education during orientation programs for new staff.
RECOMMENDATIONS

- Mandatory policy for HCWs to be vaccinated against hepatitis B and to demonstrate protective antibody levels in serum post vaccination

- HCW education on the benefits of participation in research activities as a contribution to the body of scientific knowledge

- Public health perspectives
STUDY LIMITATIONS

- Vaccination status determination was dependent on honesty of HCW and in the absence of records, was not verifiable.

- Inability to do the serological markers to verify immunity post infection or post vaccination
Discussion....

Questions?