Effects Of Alternating East-West Rotations On Aircrew Fatigue

Michel Klerlein (M.D.), Alain Gisquet (M.D.)
Air France Occupational Health Services
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Both authors are employees of Air France. Their opinion does not necessarily reflect the views of Air France.
During systematic occ.med. follow up

Criteria:
- At least 4 rotations during last 6 weeks
- Exclusion return to work after sickness or on request exams

Inclusion of 296 cabin crew, 61 captain, 96 F/O

Main outcome: Samn-Perelli fatigue scale

<table>
<thead>
<tr>
<th>Samn-Perelli fatigue checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fully alert, wide awake</td>
</tr>
<tr>
<td>2. Very lively, responsive, but not at peak</td>
</tr>
<tr>
<td>3. Okay, somewhat fresh</td>
</tr>
<tr>
<td>4. A little tired, less than fresh</td>
</tr>
<tr>
<td>5. Moderately tired, let down</td>
</tr>
<tr>
<td>6. Extremely tired, very difficult to concentrate</td>
</tr>
<tr>
<td>7. Completely exhausted, unable to function effectively</td>
</tr>
</tbody>
</table>
## Fatigue, Sleepiness, Sleep Quality: frequent complaints

<table>
<thead>
<tr>
<th></th>
<th>Cabin Crew n = 295</th>
<th>Captain n = 61</th>
<th>First Officer n = 96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>44.1</td>
<td>55.1</td>
<td>44.7</td>
</tr>
<tr>
<td>Commuting (mn/d)</td>
<td>118.0</td>
<td>89.6</td>
<td>109.3</td>
</tr>
<tr>
<td>Epworth Score</td>
<td>10.8</td>
<td>9.7</td>
<td>11.2 (p = 0.027)</td>
</tr>
<tr>
<td>% Epworth &gt; 10</td>
<td>51.2 %</td>
<td>42.6 %</td>
<td>54.2 %</td>
</tr>
<tr>
<td>Sleep quality</td>
<td>2.62</td>
<td>2.37</td>
<td>2.50</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>50.0 %</td>
<td>41.0 %</td>
<td>41.7 %</td>
</tr>
<tr>
<td>On sleeping pill</td>
<td>17.6 %</td>
<td>11.5 %</td>
<td>20.8 %</td>
</tr>
</tbody>
</table>

Overall differences are not statistically significant (Except for internal comparison in pilots)
The Air France network:
layovers mentionned in the questionnaire
East-West alternances are common

Alternance are defined by a difference of minimum 3 h combined to an opposite jetlag between 2 consecutive layovers.
Small relationship between SP score and count of E/W switches

Samn-Perelli score by the count of alternances

- Moderately_tired
- Little_tired
- Somewhat_fresh

Number of East-West switches

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Combining jet lag and E/W alternance: the $GK_i$ index

$$\sum[|\text{jetlag}| \times (1 + \text{EW switches})] = GK_i$$
GK_i properties

![Histogram and boxplot with statistical measures]

**Intervalles de confiance = 95 %**

- **Moyenne:**
- **Médiane:**

![Scatter plot of GK index against number of E/W switches]

**Rapport récapitulatif pour ASTREINTE**

**Intervalle de confiance = 95 %**

- **Moyenne:**
- **Médiane:**

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No univariate relationship between $GK_i$ and Fatigue ...
Neither in multivariate analysis

- No relationship with the strain index
- But some link with sleep quality, somnolence and being female

Coefficient plot of a multilinear regression
(dependant variable: Samn-Perelli score when filling the questionnaire)

- Age
- Seniority
- Commuting
- Epworth
- Sleep qual.
- Wake duration
- GK index
- Gender=2

R-square = 37.5%

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In summary

➢ No link in multivariate analysis between fatigue, intensity of jet lag and E/W alternance during the last 6 weeks

➢ According to crew, airlines should minimize E/W alternance at 1 per month

➢ Despite these results, the occupational medecine department supports this recommendation on the basis of
  - Bad baseline sleepiness and fatigue scores
  - Fear of enhanced consumption of sleeping medications
Questions ?