Finding a Balance between Mood and Energy Level in a Rotational Work System

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The impact of rotational work system on the mood and energy level among Oil and Gas workers was evaluated. The design was set in Port Harcourt metropolis Nigeria and questionnaire, cohort session and interviews were the instruments deployed. Questionnaires were administered to randomly selected workers from international Oil and Gas Companies located in Port Harcourt, Questions that bothered on the effect of rotational work on the mood and energy level of Oil and Gas workers were posed. It was observed that 38.8% and 41.2% agree and strongly agree that their mood is affected on site while 13.8% remained neutral. Interestingly, over 80% of Oil and Gas workers agreed to feeling of anxiety from the interview and cohort sessions. 40% and 43.8% of workers agree and strongly agree respectively that rotational work does affect their energy on site. Obtained median of 4 means that over 50% of the response belongs to the category that agree strongly agree while a mode of 5 has more responses in the category of strongly agree which is in agreement with results from the percentage frequency. Rotational workers were affected by absence from family and loved ones, social isolation and constant reminder of hazard and working

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in hazardous environment with work pressures and unrealistic deadlines. These cause depression and general dissatisfaction with life. Results from interviews revealed neglect of mental wellness of workers. The Oil and Gas workers are willing to face these hazards because of the economic gains arising from their work, however provision of recreational amenities and making policies that bring the Oil and Gas workers back home every seven days forbidding the schedule of trainings and workshops during time off duty will make rotational work more bearable.

Keywords: Rotational work; oil and gas companies; stress; occupational hazards; work shift.

1. INTRODUCTION

An article released by the Vanguard Newspaper in 2018 had the title “Nigeria: Is One in Every Five Nigerian Mad?” This got the public reaction and a lot of radio programs around the period were all about mental health. The permanent secretary of Nigerian’s Federal Ministry of Health stated in that publication that mental illnesses can be caused by environmental stresses, genetic factors, biological imbalance, or a combination of any of the three causes [1]. In a similar publication by the Health and Safety Executive on mental health conditions, work and the workplace, it was stated that work related stresses can aggravate an existing mental condition [2].

The Oil and Gas work environment are replete with a lot of stresses. The work environment is so hazardous that in a bid to raise safety consciousness these hazards are talked about all the time, during induction, toolbox talks and drills. These conversations while achieving its aim of safety consciousness among workers also triggers fear. A publication by Harvard Health Publishing [3] and an update in 2020 on Understanding the stress response acknowledged fear as one of the stresses which when allowed for a long term has a chronic effect on the physical and psychological health.

Mood affects every aspect of an individual’s life from how they feel about themselves and about their relationships on different level and their physical health. Mood disorder causes trouble with sleeping, lack of energy and heart diseases [4].

1.1 Statement of the Problem

Rotational work is considered a risk factor for some health problems in some individuals, as disruption to circadian rhythms may increase the probability of developing cardiovascular disease, cognitive impairment, diabetes, and obesity, among other conditions [5]. Rotational work can also contribute to strain in marital, family, and personal relationships [6]. A marriage where one partner works an irregular rotational shift is six times more likely to end in divorce because of the mental health issues of the person than a marriage where both partners workdays [7]. The study therefore sought to evaluate the impact of rotational work on mood, anxiety and energy levels of Oil and Gas workers in Port Harcourt.

2. METHODOLOGY

The study was done using simple random design. Workers selected from Oil and Gas companies within the Niger delta region of Nigeria were drawn from Harcourt, Nigeria. Test-retest method was deployed to validate the instrument.

2.1 Inclusion and Exclusion

2.1.1 Inclusion

1. This research includes adults in Oil and Gas industry within the ages of 31-69 years.
2. Those with no history of previous mental illnesses.
3. Those with no debilitating physical illness such as cardiovascular, metabolic or neurological illnesses.

2.1.2 Exclusion

1. All staff above the age the 60 years including contract staff.
2. Those with known history of mental illness.
3. Those with known debilitating physical illness such as cardiovascular, metabolic or neurological illnesses.

2.2 Instrumentation

The instruments for the determination of psychological and social disorders are:

1. Questionnaires
2. Interview session
3. Cohort session
The questionnaire, interview and cohort sessions were developed using SCAN (Schedule for clinical assessment of Neuropsychiatry) [8] which comprises of a set of checklist that affects different areas of mental wellness (Occupational stress, work pressure, anxiety depression, job dissatisfaction, family constrains, health issues etc.)

2.3 Questionnaires

The questionnaires were generated using the google form application and sent to the target population (after validation), it was however observed that the response was slow, so these questionnaires was send to the mobile phones of the target population, this option was used against the traditional paper distribution because of the convenience and due to the COVID-19 pandemic practice of avoiding crowd and physical distancing. The questionnaires were randomly distributed via the internet to Oil and Gas workers in the study areas.

2.4 Interview Session

The target interviewees were pre-informed about the interview and that the interview will be recorded to enable extraction of correct information for statistical analysis of data. Confidentiality was committed to by both parties. One-on-one phone interview was done, and the data extracted.

2.5 Cohort Session

A zoom invitation was sent out to a group of Oil and Gas workers that work in different locations; the meeting was anchored by the researcher were an ice breaking session bothering on mental health was discussed. A series of questions were asked, and responses were posted in the message chat box. These chat responses were extracted and analyzed.

2.6 Sample Size Determination

The sample size of this research was calculated using Taro Yamane formula [9] which formula is presented as thus:

\[
 n = \frac{N}{1 + N(e^2)}
\]

Where \( N \) = number of people in the population, \( e \) = acceptable sampling error (%)

Fifteen (15) structured telephone interviews were conducted with rotational Oil and Gas workers. The interviews were conducted via telephone only, this is because it was more practicable and due to logistics reasons also. Interviews were done until no new relevant information were obtained; all interviews were recorded. The interview sessions ranged from nine minutes to twenty minutes. Sample notes were taken immediately after each interview. The sample size used for the interviews was selected using some guiding principles.

The guiding principle used in selecting the sample size for the interview is what is called saturation. Saturation as defined by Glaser and Strauss [10] in these terms “The criterion for judging when to stop sampling the different groups pertinent to a category is the category’s theoretical saturation. Saturation means that no additional data are being found whereby the sociologist can develop properties of the category. As he sees similar instances repeatedly, the researcher becomes empirically confident that a category is saturated”.

Saturation is commonly used to indicate that, the data have been collected up to a point that more data will not give any new information related to the research, so further data collection are unnecessary.

Mason [11] by using qualitative approaches and qualitative interviews with a wide range of sample sizes was able to show in his study findings that the most common sample sizes using saturation as the guiding principle of qualitative studies were 20 and 30 followed by 10, 25 and 40. In this study, for the interview sessions, saturation was reached at a sample size of 15.

3. RESULTS AND DISCUSSION

3.1 Demographics

Table 1 shows responses to the questionnaire question on age range 76.2% fell within the age range of 31 to 40 years while, 21.2% fell within 41 to 50 years and 2.5% within 51 to 60 years. The gender distribution (Table 2) of the respondents revealed that 96.2% of the workers were male, 1.2% are female and 2.5% did not select any gender. The result on the marital status of the Oil and Gas workers, showed that 93.8% of the Oil and Gas workers were married or have domestic partnership, 2.5% were single,
2.5% were divorced while 1.2% were widowed (Table 3).

3.2 Effects of Rotational work on the Mood of Oil and Gas Workers

A summary is given in Tables 4, 5 and 6 with respect to the question of effect of Rotational Work on the Mood of Oil and Gas workers. It was seen that 38.8% and 41.2% agree and strongly agree that their mood is affected on site while 13.8% remained neutral; 45.0% and 31.2% agree and strongly agree their mood is affected when they are at home and 15.0% were neutral. 43.8% agree and strongly agree that their mood is affected on arrival; 46.2% and 42.5% agree and strongly agree to the fact that their mood is affected during departure. The median and mode with respect to their mood on site were 4 and 5 respectively. With a median of 4 it means over 50% which is over half of the respondents agrees and strongly agrees that their work has effect on their mood on site, while a mode of 5 tells us that the most popular option in this category is strongly agree. The median and mode has the same conclusion as the percentage frequencies.

3.3 Effects of Rotational Work on the Energy Level of Oil and Gas Workers

Table 6 showed the effect of rotational work on the energy level of Oil and Gas workers. Results revealed thus: 40% agree while 43.8% strongly agree that rotational work does affect their energy on site. The median of 4 means that over 50% of the response belongs to the category of agrees and strongly agrees while a mode of 5 has more responses in the category of strongly agree which is the same as the result of the percentage frequency of 43.8%; 38.8% both agree and strongly agree that their energy is affected while at home. 48.8% and 37.5% agree and strongly agree that rotational work affect their energy on arrival while 7.5% and 33.8% agree and strongly agree respectively that their energy is affected during arrival. A summary is given in the following Table 6.

3.4 Discussion

3.4.1 Demographics of study population

3.4.1.1 Age

Findings revealed that majority of rotational Oil and Gas workers work offshore and this agrees with the findings of Berthelsen et al. [12] and Yeom [13]. More males do rotational work as compared to females in the Oil and Gas sector. Majority of the workers’ ages ranged from 31 to 40. In other studies, majority of workers’ ages ranged from 30 to 49 [12] and 30 to 39 [13].
Table 4. Effects of rotational work on Mood of workers

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree (SD)</th>
<th>Disagree (D)</th>
<th>Neutral (N)</th>
<th>Agree (A)</th>
<th>Strongly Agree (SA)</th>
<th>No response</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers on site?</td>
<td>2 (2.5%)</td>
<td>3 (3.8%)</td>
<td>11 (13.8%)</td>
<td>31 (38.8%)</td>
<td>33 (41.2%)</td>
<td>5</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers at home?</td>
<td>3 (3.8%)</td>
<td>4 (5.0%)</td>
<td>12 (15.0%)</td>
<td>36 (45.0%)</td>
<td>25 (31.2%)</td>
<td>5</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers on arrival?</td>
<td>3 (3.8%)</td>
<td>3 (3.8%)</td>
<td>2 (2.5%)</td>
<td>35 (43.7%)</td>
<td>35 (43.7%)</td>
<td>2</td>
<td>5</td>
<td>4.00</td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers during departure?</td>
<td>4 (5.0%)</td>
<td>1 (1.2%)</td>
<td>4 (5.0%)</td>
<td>37 (46.2%)</td>
<td>34 (42.5%)</td>
<td>0</td>
<td>5</td>
<td>4.00</td>
</tr>
</tbody>
</table>

Table 5. Test of Hypothesis on mood

<table>
<thead>
<tr>
<th></th>
<th>Pearson Chi-Square value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers on arrival?</td>
<td>13.414</td>
<td>.201</td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers at home?</td>
<td>8.053</td>
<td>.428</td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers on site?</td>
<td>12.223</td>
<td>.142</td>
</tr>
<tr>
<td>Does rotational work affect the mood of Oil and Gas workers during departure?</td>
<td>47.969</td>
<td>.000**</td>
</tr>
</tbody>
</table>

*Chi square was used to analyze posed hypothesis*
Table 6. Effect of rotational work on the energy level rotational workers

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree (SD)</th>
<th>Disagree (D)</th>
<th>Neutral (N)</th>
<th>Agree (A)</th>
<th>Strongly Agree (SA)</th>
<th>No response</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers on site?</td>
<td>0(0%)</td>
<td>5(6.2%)</td>
<td>8(10.0%)</td>
<td>32(40.0%)</td>
<td>35(43.8%)</td>
<td>0(0%)</td>
<td>4.00</td>
<td>5</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers at home?</td>
<td>2(2.5%)</td>
<td>4(5.0%)</td>
<td>12(15.0%)</td>
<td>31(38.7%)</td>
<td>31(38.7%)</td>
<td>0(0%)</td>
<td>4.00</td>
<td>5</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers on arrival?</td>
<td>1(1.2%)</td>
<td>2(2.5%)</td>
<td>8(10.0%)</td>
<td>39(48.8%)</td>
<td>30(37.5%)</td>
<td>0(0%)</td>
<td>4.00</td>
<td>5</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers during departure?</td>
<td>4(5.0%)</td>
<td>3(3.8%)</td>
<td>6(7.5%)</td>
<td>38(47.5%)</td>
<td>27(33.7%)</td>
<td>2(2.5%)</td>
<td>4.00</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 7. Test of hypothesis energy

<table>
<thead>
<tr>
<th></th>
<th>Pearson Chi-Square value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers during departure?</td>
<td>46.870</td>
<td>.000</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers on arrival?</td>
<td>35.216</td>
<td>.000**</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers at home?</td>
<td>20.980</td>
<td>.007**</td>
</tr>
<tr>
<td>Does rotational work affect the energy of Oil and Gas workers on site?</td>
<td>31.278</td>
<td>.000**</td>
</tr>
</tbody>
</table>

Footnote: *** significant at 1% ** significant at 5% * significant at 10%
3.4.1.2 Gender

The gender distribution of the respondents were 96.2% male and 1.2% female and agreed with Yeom [13] whose finding affirmed that the Oil and Gas industry is dominated by the male gender.

3.4.1.3 Marriage

The workers who were married in this research were more than those in the other categories and this finding also agrees with Yeom [13].

3.5 Rotational Work and the Mood of Oil and Gas Workers in Port Harcourt

Summary of the test on the effect rotational work has on mood of rotational Oil and Gas workers is given in Table 6. The null hypothesis of no relationship between rotational Oil and Gas worker and their mood during departure is rejected at 5% level of significance (Table 7), the p-value of 0.000 is less than the alpha value of 0.05(5%). It means that there is a relationship between their mood when they are departing for work but with respect to their arrival, when at home and on site; there is no relationship.

Majority of the workers agrees that their mood is generally affected by their work. In the interview session, all the workers interviewed believe that their work has a higher chance of causing anxiety for them and anxiety can also affect the mood. This is also in agreement with the cohort session where all the workers unanimously answered yes to having a feeling of edginess before going to work. This result is in line with other studies [14, 15].

For the test of hypothesis with respect to their mood, there is not enough evidence to conclude that a relationship exists between rotational work and their mood on arrival, at home or on site. But the test suggests that a relationship exist between their work and their mood when departing for work. It means that their mood is indeed strongly affected when they are departing for work.

3.6 Rotational Work and the Energy of Oil and Gas Workers in Port Harcourt

Summary of the test on the effect rotational work has on the energy of rotational Oil and Gas workers is shown on Table 7. From the result all the variables are statistically significant at 5%.

The null hypothesis is rejected for all four variables. This means that majority of the workers generally believe that their energy is affected by their work whether at home, during departure, on arrival and on site.

The energy of the workers is strongly affected by their work as suggested by the workers. From the test of hypothesis on the effect the work has on the energy of the workers, there is strong evidence to conclude that a relationship does exist between them. Similar findings were made by Rosa & Colligan [16] and Simoes et al. [14].

4. CONCLUSION

Rotational work distorts the circadian cycle, makes workers absent from family and loved ones which engenders social isolation. Oil and Gas workers are constantly reminded of possible accident in a bid to increase their risk awareness since they work in extremely hazardous environment with work pressures, these factors affect their mood, causes depression and general dissatisfaction with life, these effects are indicative of the state of their mental health. Most Oil and Gas workers admitted their willingness to face these hazards because of the economic gains arising from such work. It is therefore recommended that provision of recreational amenities and making enabling policies that brings the Oil and Gas workers back home every seven days as well as scheduling of trainings and workshops only during their time-off be made to instill some form of balance and make rotational work more bearable.

CONSENT

As per international standard or university standard, Participants’ written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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