Telemonitoring for Screening and Surveillance of Type 2 Diabetes and Related Conditions on Saipem’s Offshore Vessel

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Diabetes mellitus is one of the most serious chronic degenerative diseases that requires continuing medical care, patient education and support to prevent and reduce the risk of long-term complications. Recent WHO statistics show that more than 220 million people worldwide have diabetes and almost 3 million deaths per year are attributable to diabetes.
Scope and Objective

The objective of this study is to determine the feasibility of Telediabetology service on offshore operating vessel Saipem 3000.

Focus on the effectiveness of remote glycemic telemonitoring system of the working population in offshore vessels; especially the employees with known cases of diabetes mellitus and those who are on high risk category to develop T2DM.
Structures Involved

Menarini Diagnostic
MedicAir Italy
Giovanni P. II Hospital
Saipem SpA
S3000
Molinette Hospital
2T Info service
Diabetology Center Turin
Methods - Telediabetology system

OFFSHORE VESSEL

Medical officer explains about the procedure

Setting the device for use

Spotting the blood on the strip

Diabetologist analyzing and reporting with relevant recommendations

Results/data transferring to the web system through Ethernet

Get the result of blood sugar

Automatically archive in GiPSI

Sending pdf format report to the vessel doctor

Stored in web site

Report analysis and further management of patient
A survey was conducted to find out the diabetic risk status of employees working onboard Saipem 3000.

A Diabetic Risk Score Questionnaire (DRSQ) was distributed to the employees through health department.

Overwhelming 99% or 214 of the 216 employees submitted their responses.
99% of the total population were screened
171 were eligible for monitoring and 43 are free from diabetic risk
151 are presently being monitored
106 employees were low risk of developing T2DM in 10 years
53 employees were slightly high risk, 7 are moderate risk and 2 are high risk
3 employees were known Diabetics.
151 employees were monitored continuously and 20 were either not enrolled or withdraw.

13 refused to join or withdraw after initial participation
6 were transferred to other location
1 employee resigned
Results of Blood Glucose monitoring

From 151 employees enrolled

- 127 employees showed normal glucose during the entire monitoring period
- **22 employees or 15% showed abnormal findings** at least once in 3 months analysis
- 2 are known diabetics with abnormal results
During the first analysis, 8 employees showed very high glucose values and 12 employees with slightly high. In addition, 2 employees showed abnormal slightly high results after initial analysis.

Results implies that these employees were probably not aware of their blood glucose status.

From these 22 employees with abnormal results, the last recorded data are:

- 13 employees had normal results
- 9 had slightly high value
- only 1 had very high value

Note: The reference value is based on the Diabetologist analysis on individual cases.
<table>
<thead>
<tr>
<th>Cases</th>
<th>Level of risk (Low-5 High-1)</th>
<th>Recommendations</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Initial Class</td>
<td>Mid Class</td>
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<tr>
<td>Case 1</td>
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<td>3</td>
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<td>Case 2</td>
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<td>Case 7</td>
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</table>
The study reveals that Telediabetology in offshore vessel is efficient, and can provide a new perspective in Telemedicine.

The accomplished results indicate the interest and cooperation of the offshore employees in remote glycemic telemonitoring system.

There is also efficiency and accuracy of the whole structures involved in this system, both internal and external organizations.

The achieved result from blood glucose monitoring population divulge the improvement in management of the observing population through telediabetology service, especially those who are in very high risk to develop T2DM.
Conclusion 2/3 - Problems encountered

1. **Lack of backup programs** — Telediabetology has to be reinforce with other health programs such as Diet control, exercise program, Diabetic awareness campaign etc.

2. **No monitoring continuity during vacation period** — Alternative solution has to be addressed such as involvement of employee’s family doctors in the monitoring process.

3. **Dropouts from the program due to job security concerned** — Well oriented awareness campaign and counseling has to be established to gain and maintain the confidence of employees.

4. **No facility for the employees to view personal glycemic records in web environment** — Facility to access individual records has to be provided to employees by Telediabetology program provider.

5. **Increase frequency of monitoring schedule even for low risk population** — The current number of monitoring schedule has to be studied exhaustively to determine the reasonable and balance frequency of blood glucose testing with respect to the different risk groups.
Other remote telemonitoring programs such as haematological and biochemical investigations including lipid profile and cardiovascular assessment has to be developed and incorporated with the existing Telediabetology program.

Future studies has to be carried out, focusing on the improvement in quality of metabolic status of workers, reduction and prevention of critical situations (diabetes related sickness) and elimination of possible industrial accidents in workplace due to diabetes. Improvement in life quality of diabetic employees, prevention of occurrences of complications in diabetic workers and reduction of health care cost for the company are also considered in the future studies.