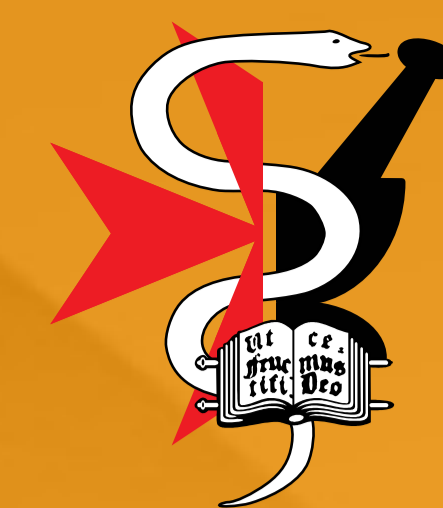


# CHRONOPHARMACOLOGY IN TYPE I DIABETES

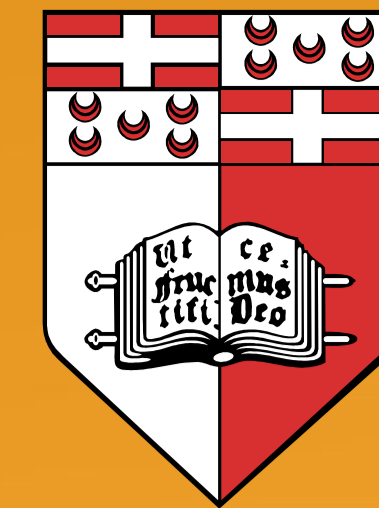
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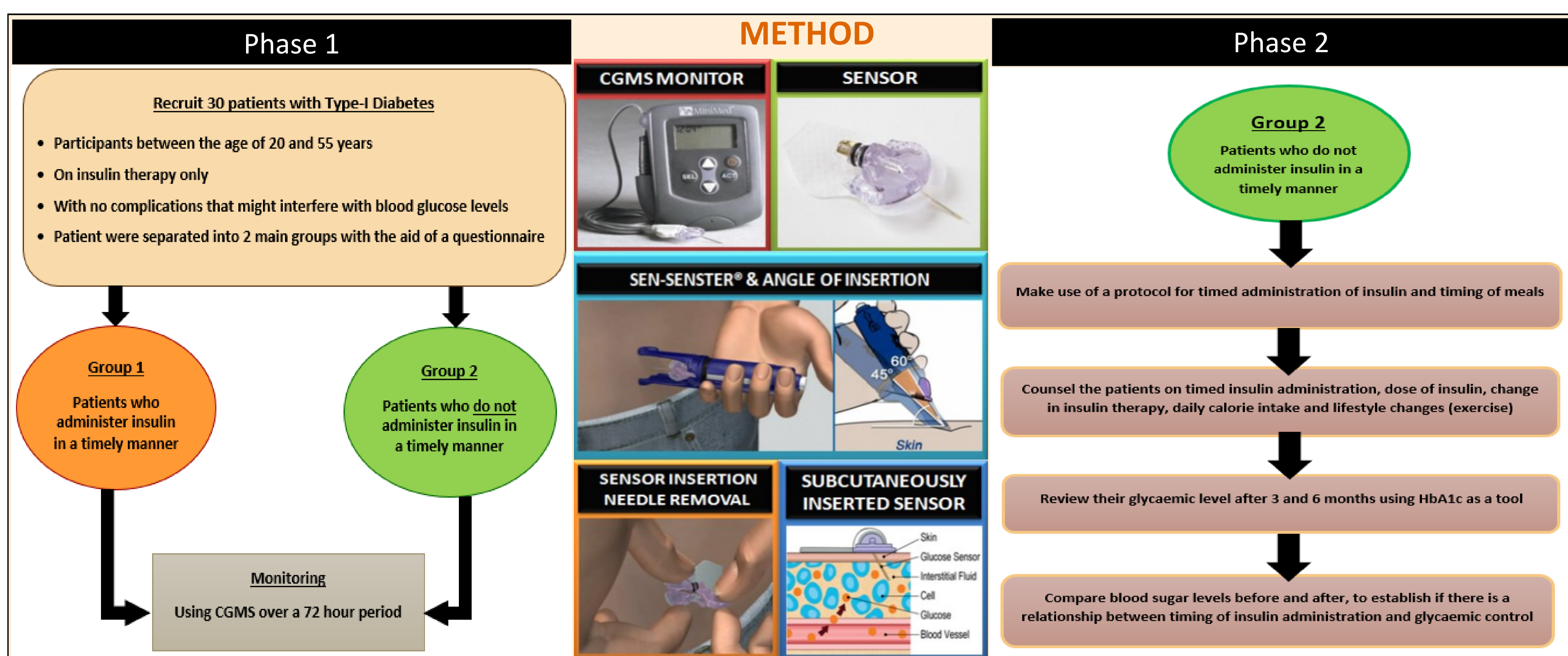
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## INTRODUCTION

'Chronopharmacology is the investigative science that elucidates the biological rhythm dependencies of medication'<sup>[1]</sup>. This signifies the investigation of the effects of drugs on biological timing and the effect of circadian rhythm on the pharmacokinetics of the drug. In this study Insulin was the drug under investigation.

## AIMS

1. The possibility of a relation between *timely* administration of *short acting exogenous Insulin* 20-30 minutes before meals, and effective glycaemic control.
2. The possibility of a relation between the *timely* administration of *intermediate or long acting exogenous insulin* and effective glycaemic control.
3. Presence of Dawn and Somogyi phenomena and its correlation with glycaemic control.
4. The possibility of improvement in the glycaemic profile of Group 2 patients after *counselling* on regular *timed* insulin administration and/or the possibility of changing the insulin type/insulin regime appropriately.



## RESULTS

- Participants with Timed administration of the short acting Insulin display a better glycaemic profile than those with Untimed administration (p value 0.0005) - Figure 1.
- Participants with Timed administration of the Intermediate or Long acting Insulin display a better glycaemic profile than those with Untimed administration (p value 0.000) - Figure 2.
- Participants who do not experience the Dawn Phenomena display a better glycaemic profile than those who do (p value 0.021) - Figure 3.
- Participants who experience the Somogyi Phenomena display a better glycaemic profile than those who do not (p value 0.016) - Figure 4.
- Participants in Group 2 who were given counselling, display a better HbA<sub>1c</sub> level after both three (p value 0.0195) and 6 months (p value 0.037) - Figure 5 and Figure 6 respectively.

Figure 1: The relationship between timed and untimed short acting insulin administration and Post-prandial glucose 2 hours after meals.

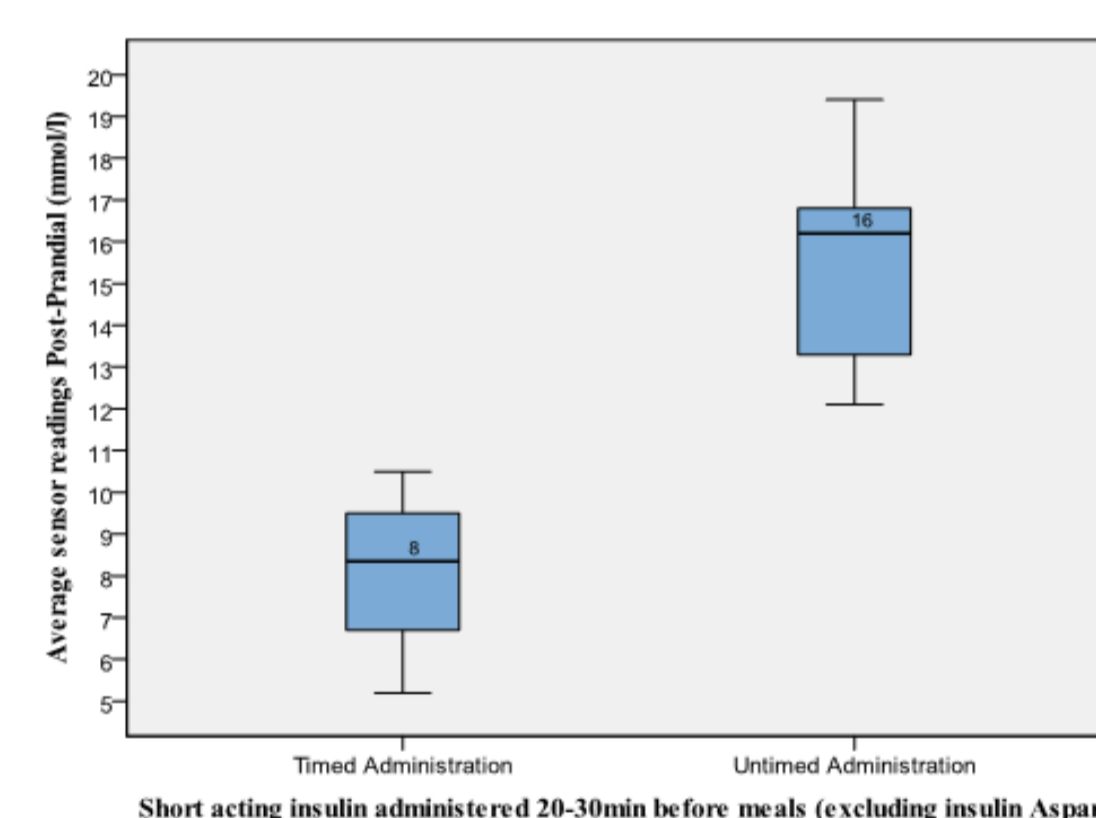


Figure 2: The relationship between Average duration in normal limit during the 72 hour period and timed and untimed Intermediate/Long acting insulin administration of the participants.

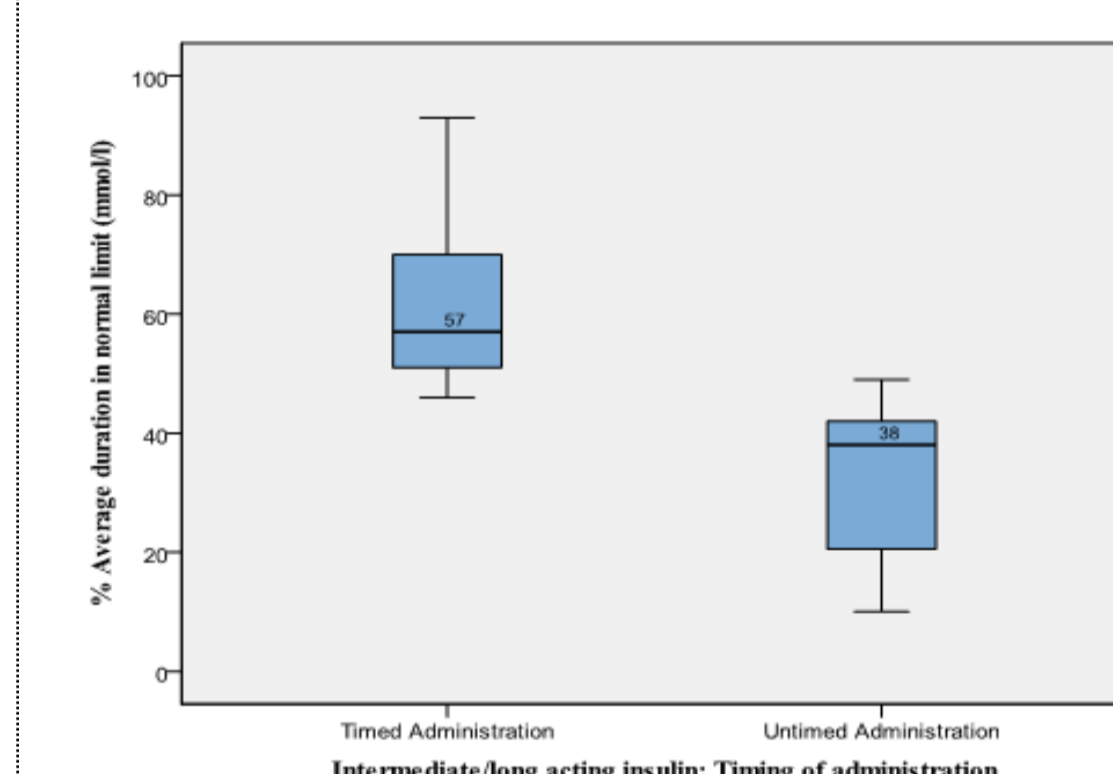


Figure 3: The relationship between the presence of Dawn Phenomena and the % average duration above high limit in Type I diabetic participants during the 72 hour period.

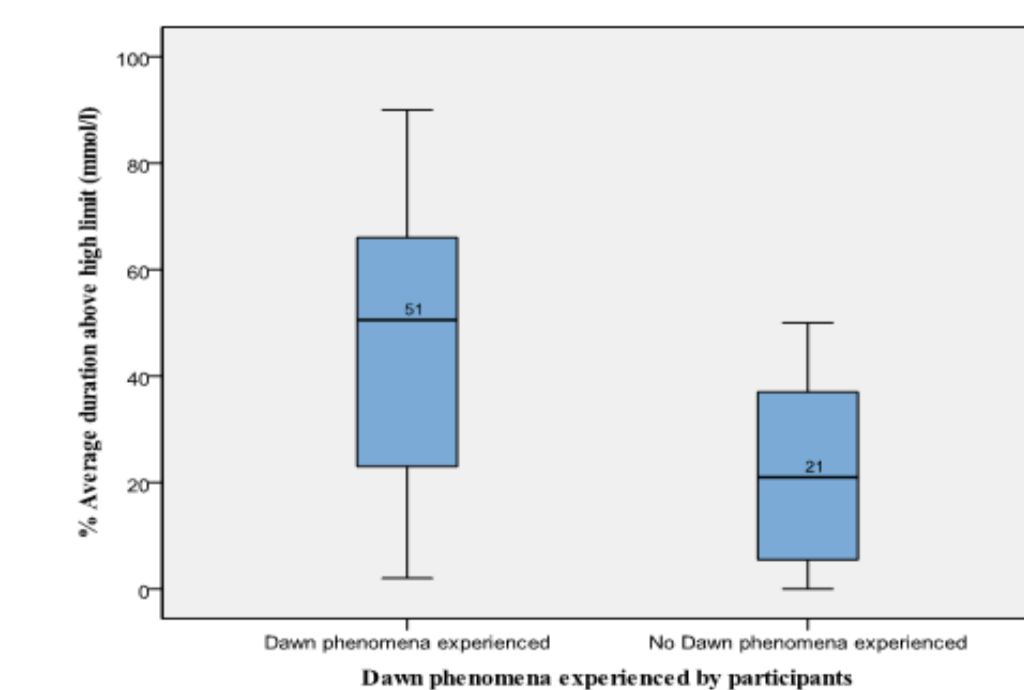


Figure 4: The relationship between the presence of Somogyi Phenomena and the % average duration above high limit in Type I diabetic participants during the 72 hour period.

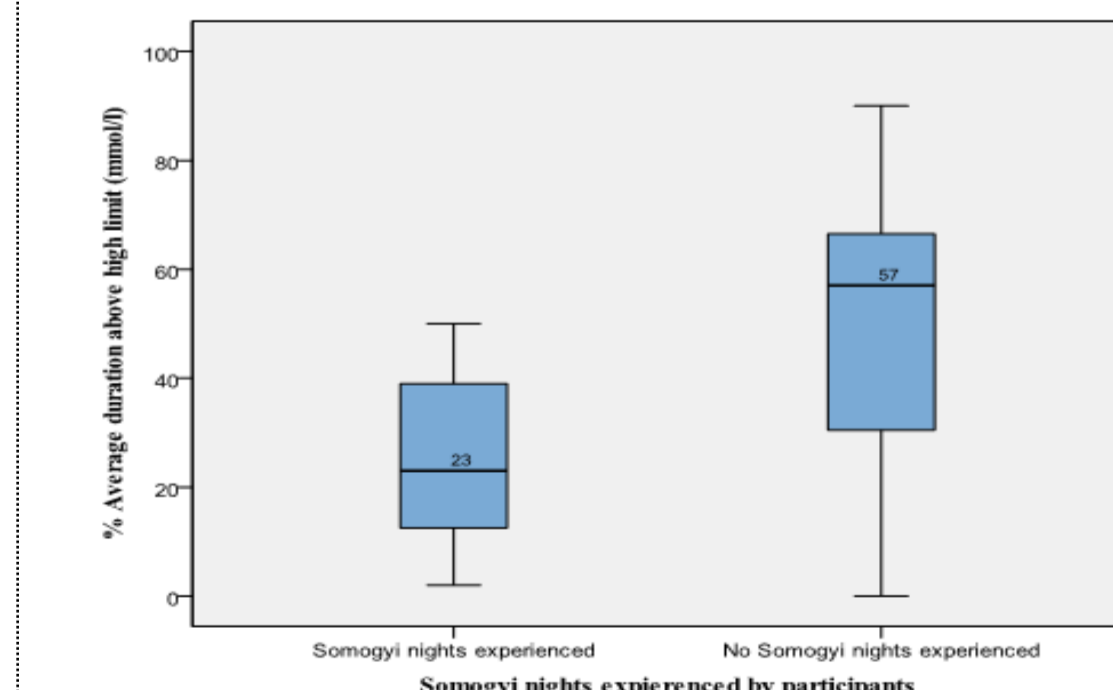


Figure 5: The relationship between HbA<sub>1c</sub> levels of Group 2 participants before and 3 months after counselling.

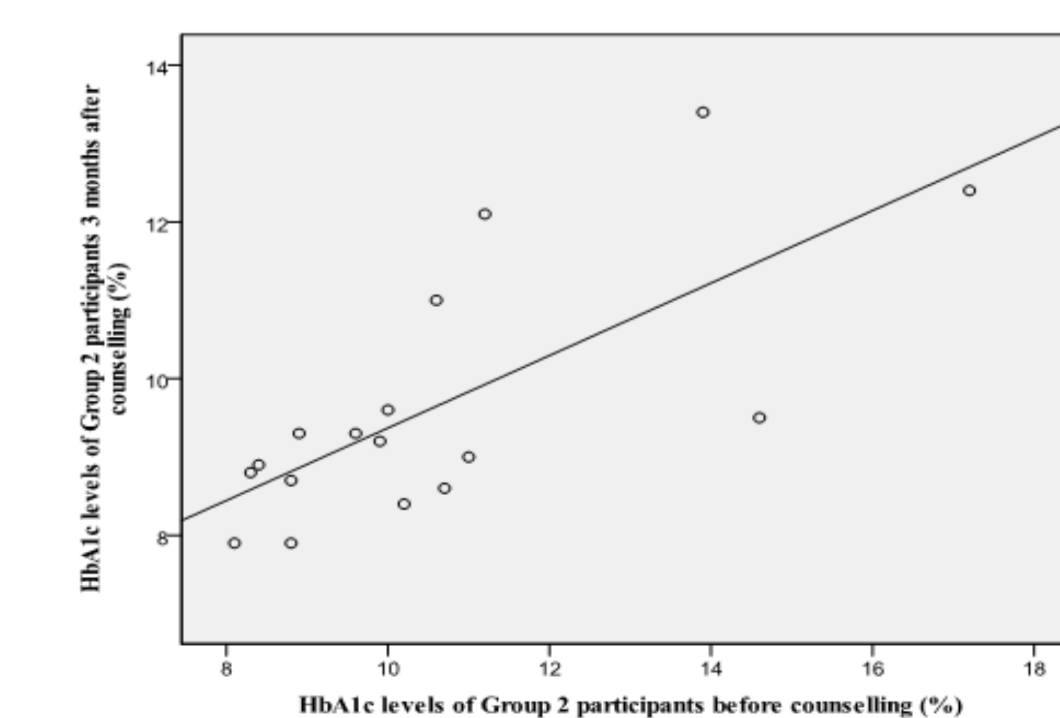
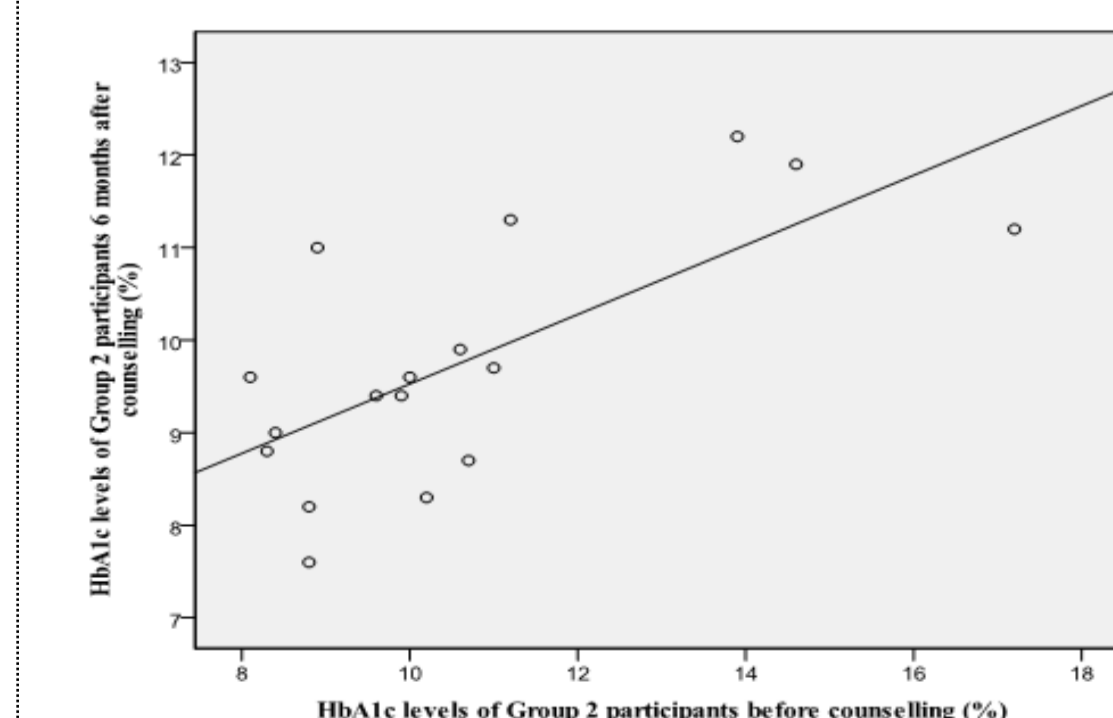


Figure 6: The relationship between HbA<sub>1c</sub> levels of Group 2 participants before and 6 months after counselling.



## CONCLUSION

The study has confirmed that administering exogenous insulin being short acting, intermediate or long acting in a regular and timely manner in Type I diabetics results in a better glycaemic profile and better overall glucose levels. Conclusive evidence showed the presence of both Dawn and Somogyi phenomena in the studied Type I diabetic patients. Counselling Type I diabetics on the administration of insulin in a regular timed manner in relation to their daily meals resulted in better blood glucose control which in turn will reflect in less long term complications of diabetes.

### Reference

[1] Krishna M, Semwal BC, Neelam S, Rugsana K, Shravan P, Bhowmik D. Chronopharmacology: as a therapy for cardiovascular disease. The Pharma Innovation 2012 May;1(3):6-15. Funding: University of Malta Research Grant: RP03-03