

Knowledge, Attitudes and Practices of South African Anaesthesiology Registrars towards Perioperative Point of Care Viscoelastic Testing

Maheshen Padayachee

Theresa Louw

Michael McCaul

Tendesayi Kafuya

Department of Anaesthesiology and Critical Care, Faculty of Health Sciences, Stellenbosch University

Introduction

- South Africa is a resource limited country where the cost of blood products are significant.
- Unnecessary blood product administration also contribute to patient morbidity and mortality.
- Anaesthetists encounter coagulopathic patients in a perioperative setting and are expected to make decisions on whether to administer a blood product or not.
- Point of Care ("POC") Viscoelastic Testing ("VET") has become a prominent modality with regards to:
 - Identifying whether a patient is coagulopathic or not
 - Identifying the cause of the coagulopathy if present and subsequent product administration.
- Available POC VET devices in South Africa: Thromboelastography ("TEG") and Rotational Thromboelastometry ("Rotem")
 - These measure the viscoelastic properties of global clot formation
 - Derive a graphical haemostasis profile made up of the various stages of clot formation (see **figure 1**)
 - The results can be interpreted by the clinician for appropriate management.

Objectives

- To determine the knowledge, attitudes and practices of South African anaesthesiology registrars towards perioperative point of care viscoelastic testing

Methods

- Study Design, Population and Data Collection**
 - A descriptive, cross-sectional study whereby a novel, electronic self-administered questionnaire designed in RedCap (database software) was used as the data collection instrument.
 - The study population consisted of approximately 426 South African anaesthesiology registrars who were part of the South African Society of Anaesthesiologists electronic mailing list.
 - Data was collected over a 4 week period commencing on the 23rd of September 2021.
- Ethics:**
 - Ethics Clearance was obtained from the University of Stellenbosch Health Research Ethics Committee.

Results

- A total of 101 electronic responses were returned (23.7% of sample population). Of these 101 responses, 71 were complete (i.e. each question in the survey was answered) and were thus analysed while the 30 incomplete responses were not included in the data analysis.
- "Senior Registrars" were defined as registrars in their 3rd or 4th year of registrar training while "Junior Registrars" were defined as registrars in their 1st or 2nd year of registrar training.

Profile of Respondents key findings

- Seniority of respondents: 54.9% of respondents were junior registrars while the remaining 45.1% were senior registrars
- University the respondents were currently training at:
 - University of Stellenbosch (60.6%)
 - University of Cape Town (19.7%)
 - University of Kwa-Zulu Natal (7%)
 - University of the Witwatersrand (7%)
 - University of Free State (2.8%)
- Proportion of respondents who have completed a rotation in critical care (i.e."ICU rotation"): 73.2%

Knowledge

- The knowledge section of the survey consisted of 5 Single Best Answer Questions. Each correct answer was worth one mark/point. The maximum score a respondent could obtain overall was 5 points while the minimum score was zero.
- Respondents who scored a total knowledge score of 3 or higher were adjudged to have an "adequate" knowledge on the subject of perioperative viscoelastic testing .
- The questions were recall based as well as scenario based in nature.
- The proportion of registrars who were found to have adequate vs inadequate VET knowledge is summarised in figure 2
- Key Findings:**
 - Senior registrars were more likely to demonstrate adequate knowledge when compared to their junior counterparts

Attitudes

- The attitude component of the survey consisted of 8 items/ statements regarding the use of perioperative POC VET in terms of its Clinical utility, cost effectiveness and whether they would like further training on the subject which the respondent could choose to agree/ disagree with on a 4 point Likert scale.
- To determine positive attitudes towards perioperative POC VET, scores derived from the participant's responses to the statements for Section D were summed up to create an overall "positive attitude score". The "positive attitude score" incorporated 5 out of the 8 statements that were posed to respondents in the attitude section.

The 8 statements presented to them were as follows:

- Standardized laboratory tests provide me with enough information about a patient's perioperative coagulation profile ^a
- VET can only be feasibly implemented in a tertiary/quaternary hospital setting in South Africa:
- VET is too expensive for a resource constrained country (such as South Africa) to have as part of standardized perioperative patient management protocol/s:
- The likelihood that TEG/ROTEM tests will form part of my clinical practice after I complete my registrar training is low
- VET should become part of my institution's/place of employment's massive transfusion protocol ^a
- VET can lead to cost savings perioperatively at my institution/place of employment if implemented appropriately ^a
- VET can lead to improvements in morbidity and/or mortality for surgical patients at my institution/place of employment if implemented appropriately ^a
- I feel I would benefit from a formal education platform on the topic of ROTEM/TEG interpretation ^a

^a = component of five item positive attitude score

- The spectrum of responses for each of the above statements is summarised in figure 3

Key Findings:

- 64.8% of registrars were found to have a positive attitude towards POC VET

Practices

- This section explored the registrars' practice/s regarding perioperative POC VET. Specifically their level of exposure to POC VET, the context in which they would use it, their perceived barriers towards using it perioperatively and their confidence in interpreting VET data with respect to patient management on a numerical scale of 1-10 whereby 1= not confident at all and 10= extremely confident (see figure 4 for breakdown of confidence scores amongst registrars).

Key findings:

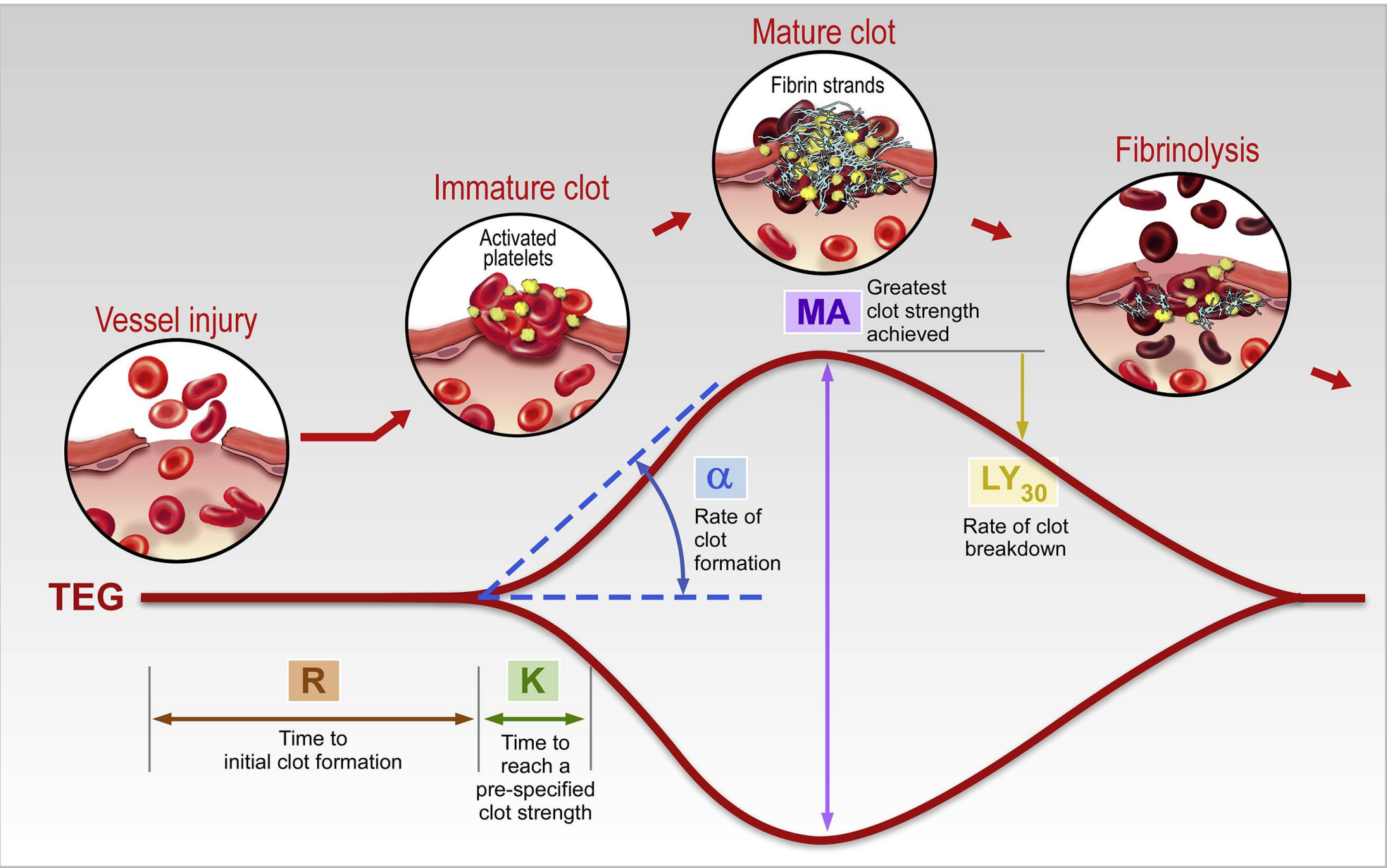
- Registrars that requested a POV VET during the course of their clinical careers: 87.3%
- Surgical Profile of POC VET requests: trauma surgery (56.5% of requests) , cardiothoracic patients (19.4%) and Obstetrics & Gynaecology (16.1%)
- Median confidence score of registrars: 6/10
- Respondents' **greatest barrier** to requesting POC VET for patients at their institution:
 - Availability of VET facilities and consumables as well as the availability of technologists/trained staff to perform the test (23.9% respectively).
 - A lack of confidence in interpreting the results of the VET (15.5%)
 - Uncertainty with respect to whether the patient would benefit from the test (14.4%)
- Statistical analysis found that the following cohorts of registrars were more likely to have a higher confidence score:
 - Senior Registrars
 - Female registrars,
 - Registrars who had completed a rotation in critical care,
 - Registrars who had completed a rotation in cardiothoracic anaesthesia

Conclusion

- Overall Knowledge of Perioperative VET was found to be satisfactory but there is still room for improvement particularly amongst the junior registrar cohort.
- While efforts should be made to reduce material barriers to the implementation of VET, the non-material factors are potential low risk, high-yield interventions for relevant stakeholder's .Targeted educational interventions that can address these factors need not be resource intensive and can be implemented comparatively quickly.
- Interventions should be implemented on both a local level (e.g. through regular workshops, courses and on-the-job training and exposure to Viscoelastic testing at respective training circuits) and at a national level. As noted previously there is currently a lack of local national guidelines with respect to perioperative viscoelastic testing.
- A multi-stakeholder team consisting of (but not limited to) anaesthetists, surgeons, critical care specialists as well as hospital managers/administrators develop a set of guidelines in this regard. These guidelines can be used as a tool for improving registrar knowledge on the subject and can be used for improving uniformity in practices and standards across the various registrar training circuits in South Africa.

References

- Shen L, Tabaie S, Ivascu N. Viscoelastic testing inside and beyond the operating room. Journal of Thoracic Disease. 2017;9(S4):S299-S308.
- Tyler PD, Yang LM, Snider SB, Lerner AB, Aird WC, Shapiro NI. New Uses for Thromboelastography and Other Forms of Viscoelastic Monitoring in the Emergency Department: A Narrative Review. Ann Emerg Med. 2021 Mar;77(3):357-366. doi: 10.1016/j.annemergmed.2020.07.026. Epub 2020 Sep 26. PMID: 32988649.



	R-time (R)	K-time (K)	Alpha angle (α)	Maximum Amplitude (MA)	Lysis % at 30 mins. (LY30)
Definition	Time to first deviation from baseline	Time for tracing to reach 20 mm amplitude	Angle between baseline and tangent line that intersects initial deviation	Maximum deviation of tracing from baseline	Decrease in curve amplitude (relative to MA) at 30 minutes
Controlling Pathways	Coagulation cascade	Fibrinogen cleavage Fibrin polymerization	Fibrinogen cleavage Fibrin polymerization	Fibrinogen activity Platelet count / quality	Fibrinolysis
Interpretation	↑ = hypocoagulable ↓ = hypercoagulable		↓ = hypocoagulable ↑ = hypercoagulable		
Therapeutic Implications	↑ = administer fresh frozen plasma	If K time is ↑ or alpha angle is ↓, then: administer cryoprecipitate or fibrinogen concentrate		↓ = administer platelets	↓ = administer tranexamic acid

Figure 1 Diagram summarising the main subdivisions of a Thromboelastogram profile as well as the corresponding stage in the clotting cascade

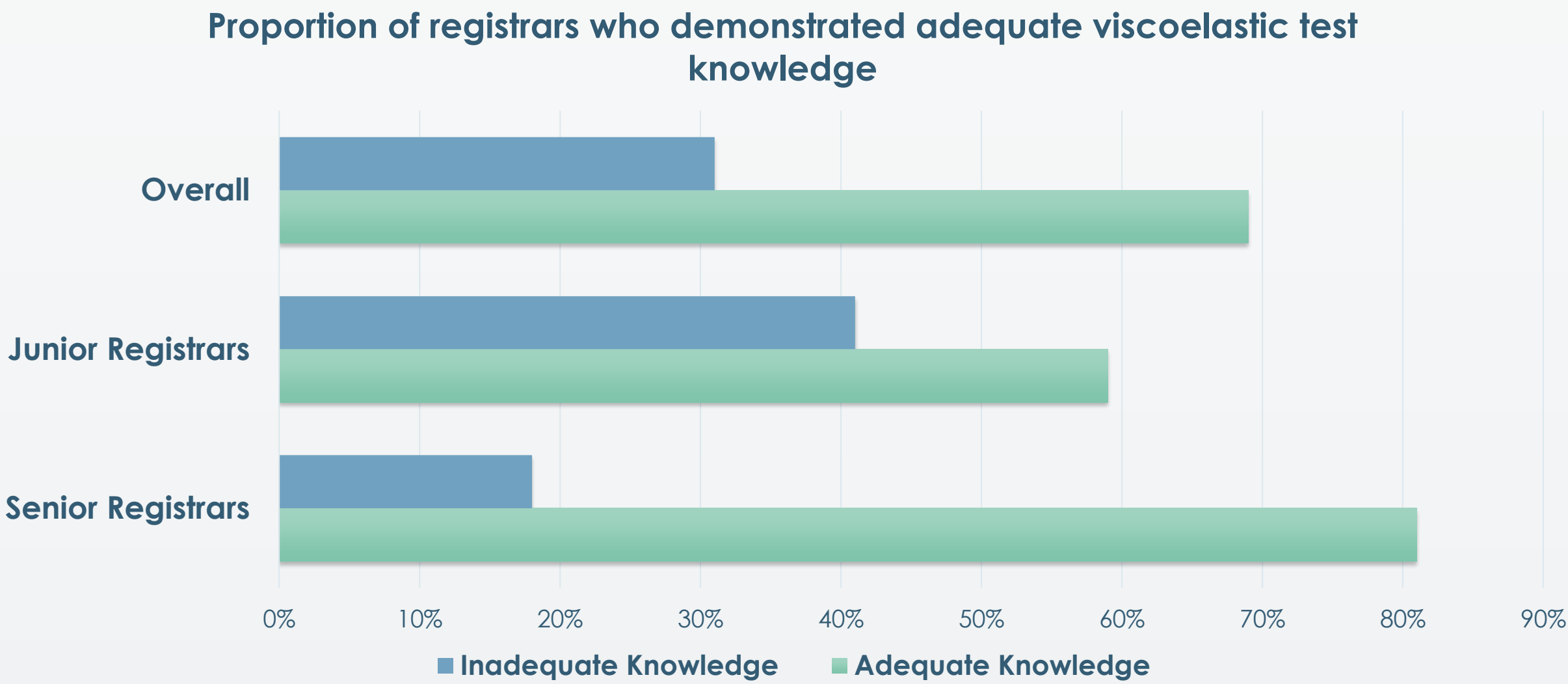


Figure 2 Bar graph summarising the relative proportion of registrars who were found to have adequate knowledge vs inadequate knowledge with respect to perioperative VET.

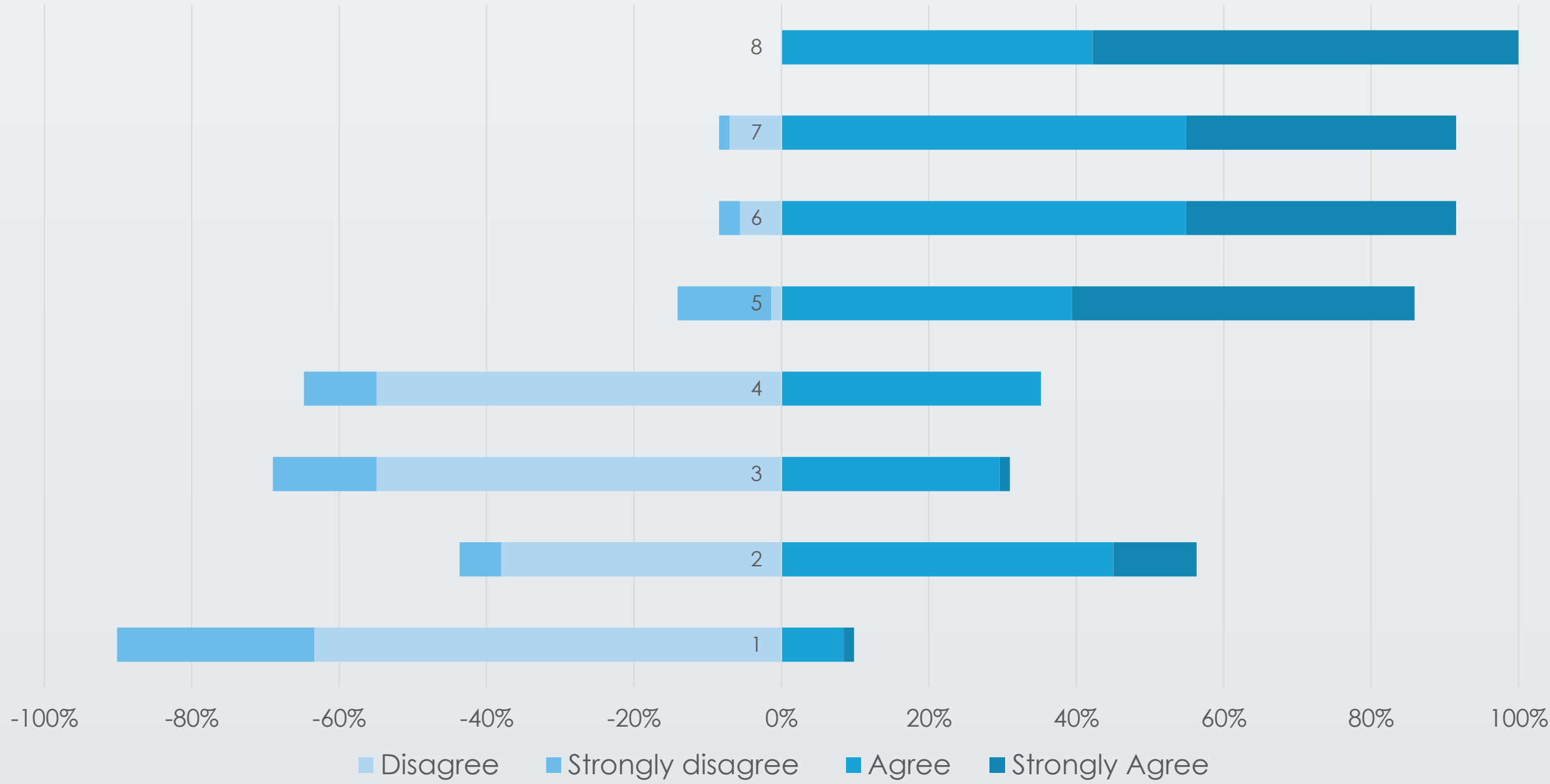


Figure 3 -Divergent stacked bar graph summarising the breakdown of responses for each respective statement in attitudes section of the questionnaire

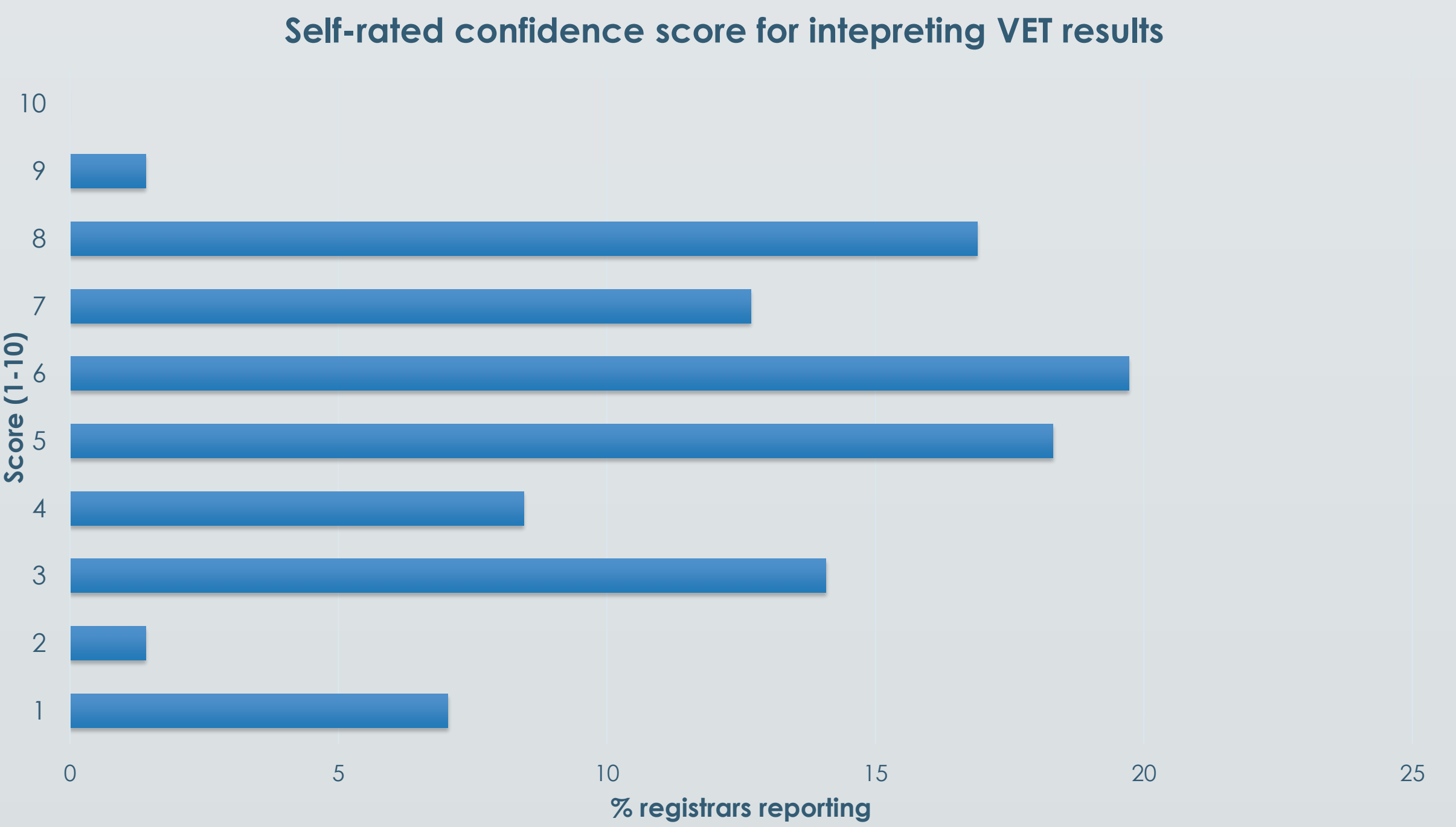


Figure 4- Bar Graph summarising the self-rated confidence score distribution amongst registrars