

Dedication

For my parents for their kind

To my wife and my children (Mohamed
Elmontaser, Sohaib & Khabab) for their
patience

To my brother, sisters, friends and
colleagues

For their encouragement and support

And every one helped me.

Acknowledgement

Thanks must first be given to Allah, for giving me health, strength, and power to achieve this work and to make my dream real.

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Abstract

The aim of this study is to evaluate the efficiency and calibration of laboratories, spectrophotometers according to the specification (ISO 15189) and depending on the conditions (4.2.5 and 5.3.2) included in the items of laboratory equipment.

At the beginning, structured questioner was conducted to assess the technician's awareness of instruments calibration. The practical results were analyzed by using Statistical package for social service (SPSS 15).

The study was applied on 40 spectrophotometers, which were calibrated by using special tools to show: the efficiency of filters to light, the severity of an accurate light degree and the ability of instrument to reach a temperature between ($25 \pm 0.2^{\circ}\text{C}$ and $37 \pm 0.2^{\circ}\text{C}$) and which has a direct impact on clinical readings of instruments.

The analysis procedure showed that a significant improvement (by 100% and $p > 0.05$) in results after calibration, which was evaluated by using the probability of obtaining a test statistic (p-value) in T test, for example the obtained results before calibration: in filter 340 nm ($P < 0.012$) with percentage average 43.9%, the temperature within range $25 \pm 0.2^{\circ}\text{C}$ ($P < 0.001$) with percentage average 8.3%, the temperature within $37 \pm 0.2^{\circ}\text{C}$ ($P < 0.001$) with percentage average 0.00%, and the degree of an accurate lamp without a filter 172 nA ($P < 0.001$) with percentage average 30.8%, which leads to conclude that a process of calibration of instruments must be performed at frequent intervals due to its importance in enhancement the clinical results.

النتائج المستخلصة

الهدف من هذه الدراسة تقييم كفاءة ومعايرة أجهزة الطيف الضوئي بالمعامل وفقا لمواصفة (ISO-15189) لمنظمة المعايير الدولية اعتمادا على الشرطين (4.2.5 و 5.3.2) المضمنة في بنود اجهزة المعامل.

و قد أجريت الدراسة على عدد (40) جهاز طيف ضوئي بعد اجراء استبيان لتقنى المعامل, وكان الهدف العام منها تقييم مدى معرفة التقنيين بأسس معايرة الأجهزة وخصوصاً كفاءة مرشحات الضوء، وشدة استضاءة المصباح درجة ومقدرة الجهاز للوصول لدرجة حرارة بين ($25 \pm 0.2^\circ \text{C}$ و $37 \pm 0.2^\circ \text{C}$) وذلك لاهميتها المباشرة على تغيير قراءات الاجهزة .

فى البدء تم جمع البيانات قبل وبعد اجراء المعايرة و تم تحليلها باستخدام برنامج التحليل الإحصائي (SPSS-15)، وأظهرت نتيجة التحليل فرقاً تحسناً بنسبة 100% ($p > 0.05$) بعد المعايرة باستخدام الفرق فى القيمة الاحتمالية للنتيجة الموضوعية فى الاختبار (p-value) وعلى سبيل المثال بعض النتائج قبل المعايرة: للمرشح (340) ($P < 0.012$) و $P < 0.001$ والنسبة المئوية له 43.9% و درجة الحرارة فى $25 \pm 0.2^\circ \text{C}$ والنسبة المئوية لها 8.3% و درجة الحرارة فى درجة $37 \pm 0.2^\circ \text{C}$ والنسبة المئوية لها 0.00% و درجة استضاءة المصباح بدون فلتر 172 ($P < 0.001$) و $P < 0.001$ والنسبة المئوية له 30.8% ، مما استوجب اقتراح ان تتم عملية المعايرة على الأجهزة فى فترات محددة و متقاربة نظرا للتغيرات البيئة و التذبذب فى التيار الكهربائى فى السودان، مما يؤثر سلبا في تغيير النتائج الطبية المستخرجة بهذه الاجهزة.