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Research Article

Influence of the CATACOS Mobile Application to Assess Risk in Cataract Surgery

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Received: November 17, 2021; **Published:** December 30, 2021

Abstract

Objective: To determine the influence of mobile applications as a technological tool in the Ophthalmology area. The implementation of the CATACOS virtual form was proposed as a mobile application, which measures the risk of complications in cataract surgery, determines the level of expertise of the surgeon for each case.

Methodology: The algorithm of the process and addressing was developed for entering data and obtaining the risk result through the use of a use case diagram strategy through STARUML. The sample was 103 cases from a private institution. The complication rate of ophthalmologists was compared according to the degree of experience divided into three groups: expert surgeons, young surgeons, and residents. The study was basic, case with a single measurement, descriptive. For the realization of the application, the IFRAME system was used with the help of the JOTFORM form builder.

Results: 65% of cases of moderate difficulty, 18% of low degree of difficulty, 11% of high difficulty and 6% of very high difficulty. A reduction in complications in the three cases after CATACOS application, which was 0.8% in the expert surgeon, 0.5% in the young surgeon, and 1.3% in the resident surgeon. The student's T statistical analysis obtained 9.33 with a degree of freedom of 2.

Conclusions: CATACOS influences the results before and after its use with a significance of 0.01, where the use of the application allows a reduction rate of complications.

Keywords: *Applicative; CATACOS; Cataract; Risk; Ophthalmology*

Introduction

Cataract surgery is one of the most commonly performed ophthalmological surgical procedures, since its inception it has evolved both in its extraction techniques and in the evolution of the types of intraocular lenses, this leads to more and more results. efficient and whose complications are minor. One of the pillars for good surgical results is related to the previous experience of the ophthalmologist and the learning curve during their training; in turn, we have to take into account the degree of complexity of each case [1,2]. Some investigations such as the one published by Han et al. In their article Auklandd Cataract Study IV, where they used the risk stratification and classification system "The New Zealand Cataract Risk Stratification" as a method to predict the impact of the level of complexity of cataract surgeries, classify them in order to teach training ophthalmologists effectively and thereby achieve lower rates of intraoperative complications and their learning curves, thereby achieving predictability in more than 80% of future surgeries [4,10-12]. It is our reality, either through the implementation of virtual intelligence or the use of ICT and its different branches as in medicine, mobile applications can give an answer

in a reduced time, which previously took hours of research and search [3]. Mobile applications are tools that integrate a base of algorithms created with one objective, to make our life easier and more bearable, reducing time and effort [7]. If we relate these two variables, we can design a mobile application that, by entering specific data of a patient, can make a calculation and risk assessment according to a pattern provided by means of a score and thus classify the level of complexity of a surgery cataract and that, accordingly, a specialist capable of performing said intervention can be assigned, based on their experience and degree of resolution of complexity [5,6]. Thus, if an ophthalmologist in training, who is starting his learning curve, will perform surgeries with a low level of complexity and gradually increase this level until he has a great value and ability to solve problems where they will be added more complex cases, with this the prognosis of possible complications will be lower and thus less frustration for young ophthalmologists and better surgical results for patients. At the national level we have a system implemented by the Ministry of Health, the same that is taken into account in most ophthalmological institutions, which means that they do not consider the level of difficulty of their surgeries as a starting point to have high complication rates. In our country, other digital systems are taken into account for risk classification, such as that presented by Dr Torres F, which is based on a staging and criteria to be taken into account for cataract surgery using the phacoemulsification technique, the one proposed in our study, it is directed more than anything to cataract surgery using the Mininuc technique [32]. The design of a mobile application as a tool in the evaluation of the patient who will undergo cataract surgery as a tool to classify and evaluate the risk of surgery, allows us to reduce the rate of subsequent complications and thus assign according to the degree of experience of the ophthalmologist in its different stages of training [12-14].

Methods

The population consisted of 1236 patients suitable for cataract surgery from the Private Institution of the Ophthalmology Clinic of La Selva de Tarapoto, Peru. The sample was 103 patients. The pre-experimental type study, case design with a single measurement. The CATACOS application is developed through the use of the Use Case Diagram strategy through the STARUML program, for the process that the application will have to determine the degree of difficulty for cataract surgery, according to the characteristics of the eye selected in the patient; For each patient, one of the three options is selected for each of the items, of which, according to a pre-established classification, a score of 1 to 3 points is assigned; the final score designates one of the 4 degrees of difficulty and with them the level of necessary experience required by the surgeon to reduce the rate of complications at the intraoperative time, according to the assessment of the Clinical Practice Guide for screening, detection cataract diagnosis and treatment in 2009 for classification of difficulty. For the realization of the application, the IFRAME system was used by means of the elaboration of an elaborated programming code and in aid of the JOTFORM form builder [8].

Figure 1: *Cover of the CATACOS form.*

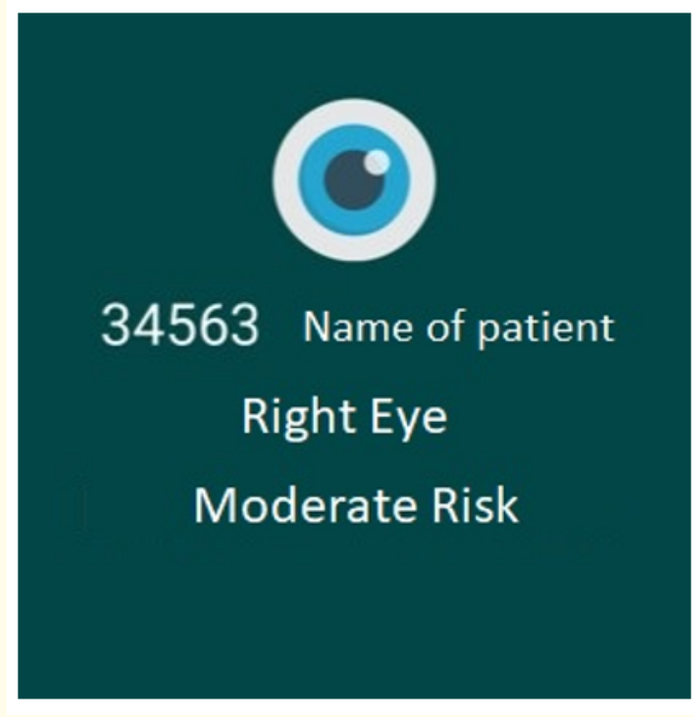

Figure 2: *Result of the degree of complexity by CATACOS.*

Results

Figure 3: *Degree of Difficulty.*

Represents the result of the formulation of 4 summations, one for each range respectively, in the application programming. 65% of cases were classified as moderate difficulty, 18% as low degree of difficulty, 11% as high difficulty and 6% as very high difficulty. This allows the ophthalmologist to be classified and assigned according to the degree of experience to perform the surgery and thereby considerably reduce the institution's complication rate. In turn, it allows classifying surgeries for educational purposes, since one of the objectives is to improve the skills of future ophthalmology specialists and, according to the surgical mentoring and training prospect, the residents of the specialty must meet a curve of learning, within them of cataract surgery, so the CATACOS application is a tool that can help choose the ideal cases for them, as was done in the work of Han "Auklandd Cataract Study IV" where they found 19% Somewhat risk, data similar to ours, where high and very high risk give a sum of 18%, which confirms the similar results of Han [11,12].

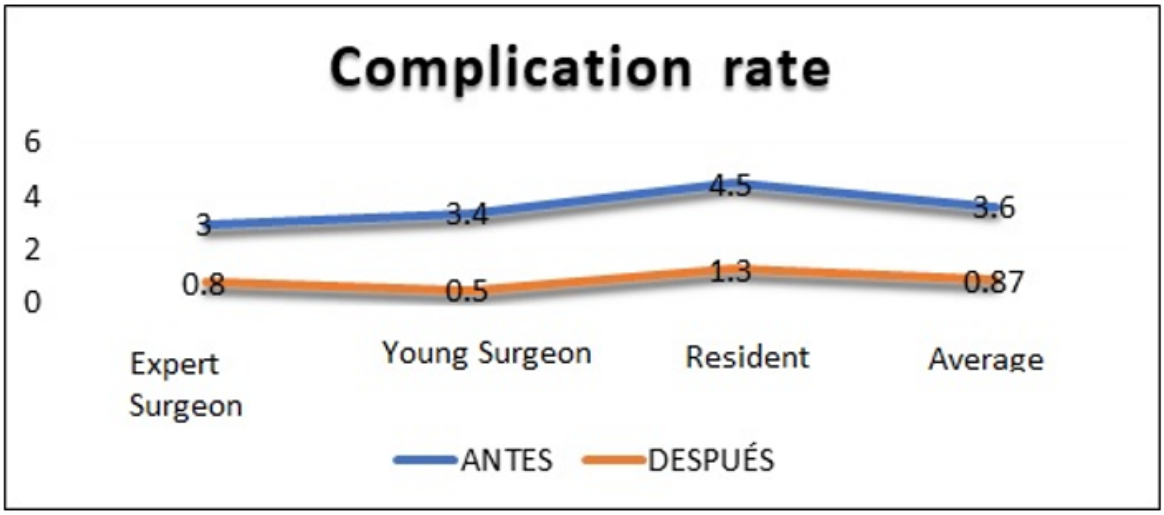

Figure 4: *Complication rate before and after the use of CATACOS.*

The data on the complication rate of the Institution was obtained according to the degree of experience of the surgeon, which was 3% in the expert surgeon, 3.4% in the young surgeon and the doctor in training 4.5%, these data are relative since it depends on the number of surgeries performed in the period, however, a reduction rate of complications was obtained in the three cases after application of the CATACOS mobile application, which was 0.8% in the expert surgeon, 0.5% in the young surgeon, and the resident surgeon to 1.3%, which shows us that for teaching and learning the curve of the same of the doctors in training improves and in the same way, better results in the patients. It should be noted that the application is based on a forecasting system based on a scoring formulation [19-21], but the risk is present at all times. The mean and standard deviation before the use of the application, which decreased from 0.7 to 0.4 after the use of CATACOS, and its mean standard error decreased from 0.4 to 0.2, which is approximately 50%. The statistical test of Student's T was used for paired samples, where a value of 9.33 was obtained with a degree of freedom of 2, which indicates that the use of the CATACOS application influences the results before and after its use. A significance level of 0.01 was obtained, which indicates a high efficiency.

Conclusions

With the creation of this form for a mobile application, it was determined that its use leads to efficient results in terms of reducing the rate of complications in cataract surgery at the Clinica Oftalmológica de la Selva institution. It is similar to other works where it is shown

that with the use of TeleOftalWeb [7] it manages to improve the efficiency in the diagnosis and classification of Diabetic Retinopathy. In the same way, it allows to systematize and statistically stratify the characteristics of cataract patients and determine the aspects to be reinforced in order to anticipate the facts of the supposed cases of intraoperative complications and to have all the tools to be able to solve them [27-31]. As in the previous studies mentioned, the classification of the complexity of the cataracts allows the surgeon not to get frustrated and to complete the learning curve according to their abilities, taking into account that the institution where the study is carried out has pedagogical purposes it is essential to balance the balance between good postoperative results and the learning of physicians in training. Thus, with the implementation of Fissios 1.0, like us, the creation of an app that helped reduce the probability of postoperative complications by 63.5% [9]. The highest level of difficulty of cataracts was MODERATE, which means that most of the surgeries must be performed by expert ophthalmologists with no less than 100 previous surgeries in practice. The use of the CATACOS application makes it possible to correlate the level of difficulty of surgeries with the skills of the different levels of expertise of surgeons, thereby reducing complication rates and improving postoperative visual results [14-17]. The CATACOS mobile application as a reference entity for the risk assessment of the La Selva Ophthalmology Clinic that would simplify the preoperative findings and even be able to extrapolate the benefits at the level of other institutions. Like other studies in which it was determined that the use of information and communication technologies is useful in the postoperative monitoring of Cataract Surgery [24-26].

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Volume 13 Issue 1 January 2022