ARisCo: Recommendation System for Risk Analysis in Mental Health of Children and Adolescents

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Abstract

In mental health care, an effective assessment of the risks patients are exposed to, is critical to offer good care and safety to them. Risks like suicide, self-aggressiveness, heteroaggressiveness and escape must be correctly handled to avoid future dangerous situations.

Several factors must be taken into consideration when assigning a mental health patient state and a correct evaluation of those factors is essential not only to build a solid risk evaluation but also for the choice of which treatment plan or intervention is the most appropriate one.

In this project we propose the development of a recommendation system to perform risk assessment for the child and adolescent mental health area of hospital Dº. Estefânia. This system aims to facilitate the process of risk assessment currently performed by doctors and nurses manually. It will be responsible to collect relevant information for the risk assignment of the children and adolescents hospitalized and to perform the risk evaluation.

Introduction

In Portugal psychiatric disorders and mental health problems are one of the main causes of disability and morbidity in the population. The number of children and adolescents who suffer from this mental illness has increased [1].

To be able to offer good conditions to the patients a hospital must perform adequate treatments and interventions which must be done accordingly to the state of the patient [2]. For example, a patient that presents very serious mental symptoms should be frequently observed, to avoid any dangerous situation.

There are not enough nurses to observe all the patients every hour of the day, and possibly not all patients need to be supervised so intensively [3]. Deciding which patients are the ones that need more vigilance is not easy, but the decision should be correctly taken so as to avoid negative scenarios. This decision is made by performing risk assessment, which consists in assessing the likelihood of risk events for the patient and identifying ways for reducing this likelihood [2]. Health professionals must take into consideration the current patient’s symptoms and create a prediction of the state of the patient and future dangerous situations that may occur. Mental health patients that present a very serious risk assessment result are the ones that must be observed more intensively.
Recommendation Systems

Nowadays systems make predictions all the time to facilitate people’s lives. Information is used to predict future events, which can help the process of decision making. A simple prediction of the weather for tomorrow, may help people plan and decide what to wear or what to do. The same happens in health care: a clinical decision is made based on the analysis of possible outcomes, based on the patients’ symptoms [4].

An adequate system for mental health care must take into consideration several risks or diseases that other medical areas do not, because of the different characteristics of people with mental health problems. For example, it must be taken into account that in this area there exists a probability of the patient committing suicide or escaping from the hospital [5].

In the same way that mental care has different characteristics from other areas of health care, children and adolescents in mental health care also have different characteristics from adults and elderly [6]. Evaluating the risks and predicting the possible outcomes for a mental patient is not an easy procedure. An outcome can depend on multiple variables and can vary from patient to patient.

Although it is a complex work, research on mental health care recommendation systems is a work that must be done, because these predictions are essential to the wellbeing of the patients. Between 3.7% - 16.6% of the patients admitted on hospitals in psychiatric areas suffered an adverse event. At least half of them were preventable [5]. An appropriate and correct clinical risk treatment can reduce unnecessary injuries, death and even reduce economic costs for the hospital [5].

Current Situation

The research on mental health systems is currently not very extensive. However there are several systems that aim to help users in the process of risk assessment, but almost none of them focus in the area of children and adolescents [7].

GRiST, is a decision support system destined to the process of risk management for mental health care and it offers a tool focused on the children and adolescents. The system is widely used by several hospitals and private institutions. It can also be used by users with no clinical training on the on-line platform [8].

IRIS, is a tool developed to perform an evaluation for the risk of suicide for adult patients who demonstrate having a suicidal ideation of any kind.

Dˆa. Estefanía hospital is responsible for the treatment of children and adolescents, one of the services in this hospital being mental health care. Their current instrument to perform the risk assessment is composed by a list of questions related to five risk categories: suicide, self-aggressiveness, heteroaggressiveness and escape. Based on the answers, a severity level of the risk is predicted for each risk category. Such levels vary according to the scale Very High, High, Medium and Low.

The treatment plan, interventions or clinical observation for the patient are decided based on the risk level predicted. It is indispensable that the prediction is correct, so as not to expose children to unnecessary interventions, as well as to both prevent dangerous situations and achieve a better management of the work of the health professionals.

Problems and Hypothesis

We will improve the risk assessment by creating a model that will be able to perform the same risk predictions as the current one, but using less input variables or different ones. Performing this process automatically will improve the work of the health professionals, so a new recommendation system responsible for processing automatically the new model will be developed.
To create the new recommendation system for the hospital, we must understand and correct the failures of the current one. The points of the model that we are going to focus on improving are:

- Identifying which information is relevant for the patient state’s evaluation.
  We will use statistical and data mining techniques to find which factors are relevant for the risk’s evaluation. We will also try to find correlated factors, the questions concerning one risk indicator that can be used to predict the outcome of another. Besides using these techniques, the health professionals involved in this project will perform focus groups, where doctors and nurses are gathered to discuss which changes should be performed on the current instrument.

- Ambiguous questions, which can lead to different evaluations depending on the interpretation of each professional, thus creating inconsistent predictions.
  This problem can be corrected by reformulating the questions, or/and by splitting them.

- Risk Assessment process is made by hand, which unnecessarily consumes time and is conducive to create errors.
  To improve this point we propose the creation of an automatic system that will collect the patient’s information and perform the risk assessment process.

**Arisco System’s Goal**

The goal of this project is to create a new recommendation system for the hospital which will perform the risk assessment, creating valid and consistent risk evaluations for the patients.

The creation of this new system will be performed in three stages:

- Analyses: In this first stage the goal is to understand the inconsistencies presented in the current model. To achieve this, data from previous patients of the hospital will be collected and will be used to perform a research using statistical and data mining approaches.

- System Development: After correcting the inconsistencies detected, a new model for risk assessment will be created. Having the new model, the goal is to create a system that will perform this process automatically.

- Validation: Both stages must be submitted to a validation process to guarantee that the model and system are correct and consistent. This validation will be performed using performance metrics and also, by health care professionals involved in this project. Besides these two ways of validation, the new recommendation system developed will be subjected to a two month test in the hospital to guarantee that the model created to perform the risk assessment is accurate and also to guarantee that the system is functioning properly.

**Mental Health Care for Children and Adolescents**

Although a lot of children and adolescents have a normal childhood, about 10% to 20% reveal psychological disturbances. One in five children presents mental problems and only 1/5 of these children receives an appropriate treatment [9]. Some adults that suffer from mental diseases presented symptoms early in childhood or adolescence, which could have been treated at an early stage of the disease in a more efficient way than with a later treatment [10]. Sadly, the area of mental health care focused on children...
and adolescents does not receive so much attention as it happens with adults and the elderly, but it is extremely important, seeing that treating children and adolescents with mental disorders can decrease the number of adults suffering from this kind of illness.

Such as other diseases, psychological disturbances have clinical criteria used to create a patient’s diagnostic. The criteria used for the creation of a diagnostic differs from area to area in medicine. Mental health care differs from other areas because the characteristics of the patients and the illnesses are different. Patients that suffer from mental illness are different, mainly because sometimes they do not realize that they’re sick and are hospitalized against their will. Risks like suicide, self-aggressiveness, heteroaggressiveness and escape from the hospital must be early predicted in order to avoid dangerous future scenarios.

These risk predictions are made by identifying the variables most frequently or strongly associated with the risk at stake. Such process is called risk assessment. After risk assessment, an analysis of the resulted prediction is done and it is decided which treatment plan is more adequate to the patient. This is called risk management. The goal of risk management is to reduce the probability of negative scenarios to occur. Of course even with a correct prediction not all risks are completely eliminated and every treatment plan carries some risk. Risk management is a cycle that is performed several times during the hospitalization of the patient.

Today’s Recommendation Systems

Recommendation systems were created due to the increasing amount of information available on the web with the goal of helping users identifying products and services. It is now mostly used in web applications of e-commerce, like Amazon, Netflix or Tripadvisor, to suggest several items that might be of interest to users. On Amazon it can suggest books the user might be interested in buying.

Recommendations are based on the profile of the user. Systems try to predict which are the most appropriate products or services based on user’s preferences and also the constrains or routines that are collected continuously every time the user uses the system. Recommendation systems use statistic, machine learning, data mining techniques to predict what items the user should have interested in.

These systems were not only created to help the users’ searching items. Organizations and companies benefit from them too. The main benefit coming from the use of these systems is the increasing number of items sold. Since the items suggested should suit the user’s needs and wants, once the item is suggested the user will probably buy it.

Health Recommendation Systems

The goal of a recommendation system in medical care is to supply to its user medical information that can be useful to identify medical treatment for a patient. Nowadays recommendation systems are trusted and used in the most diverse applications, but in areas concerning health such as diagnoses or treatments, they are still not trustworthy. Recommendation systems destined to the area of health are more complex than the systems used in sales and commerce. If the recommender system of an on-line shop fails calculating which item it should suggest the user to buy, the consequence of this failure is not very serious. In a health recommendation system such a failure can have severe consequences in the state of a patient.
GRiST and IRIS

GRiST [18] is a clinical decision support system destined to help in the process of risk assessment and management in mental health care. It performs a risk assessment focused on Children and Adolescents. GRiST is destined to be used by users without any clinic training and also by clinical experts as an auxiliary tool. A patient can provide assessments and get advice from a computerized risk expertise. The doctors can evaluate the assessment data and advise when the patient needs treatment [18]. The system records user data and provides risk estimates for suicide, self-harm, self-neglect, vulnerability and harm to others [19]. To create these risk’s estimations, a detailed data collection is done concerning the user’s situation, focused on the factors, current and past life situations that have influence on the risks. This data is collected through the GRiST questionnaire [18]. The final levels of risk predicted vary in a scale of 1 to 10, 1 being the lowest risk and 10 the highest.

IRIS, is a model developed by health professionals from Medical school and Nursing school from Coimbra [20]. This tool was developed to perform a suicide risk assessment for adults patients that present a suicidal ideation. The tool can perform the risk assessment of an adult patient very simply using a number scale which increases with the answers given to the questionnaire. The questionnaire is filled in by the health professional performing the patient’s risk assessment. Depending on the answer of each question there is a weight given. These weights are summed and in the end the final weight value indicates with level of suicide risk the patient has. The level of risk varies in a scale of Low, Medium and High.

Risk Assessment in the current model

The current hospital’s model performs the risk assessment for the risk categories of: suicide, self-aggressiveness, heteroaggressiveness, escape, adverse drug reactions and organic pathology. We will only focus on the risk categories of suicide, self-aggression, heteroaggressiveness and escape since these are the most important risk categories and the other two, are most of the times not taken in consideration by the health professionals when using the current hospital tool.

For each risk category there exists a group of questions concerning the factors that may have influence on the risk. All questions on the model are of the type ‘check box’, they are filled in if the patient’s presents the symptom. The current questionnaire was translated to English and presented as illustrated in figure 1.

After answering the questionnaire the health professionals follow the instrument’s rules to generate a prediction of the severity level of the risk. These rules consist in a combination of the factors presented in each questionnaire’s question that defines the severity of the risk for that patient. For each risk category the severity level may vary according to the scale Very High, High, Medium and Low. Children and adolescents that present severity level of ‘Very High’ are the most concerning ones and they need more severe treatment plans and interventions to avoid possible future dangerous situations [7]. All this process of risk management is made by hand by the doctor and nurses. The instrument is presented on a paper that is filled in whenever a new evaluation is made and is added to the patient’s file.

Data mining and Classification models

Data mining is the process of automatically discovering important information from large volumes of data [21]. Classification is one of the several techniques of data mining.
It consists of finding the characteristics of several data attributes and assign them to classes/categories. Models are created to perform this process, they’re called classifiers and their goal is to predict categorical class labels. Taking an example: a medical researcher is analyzing data from patients that suffer from breast cancer to predict which one of two treatments is the most appropriate: 'treatment A' or 'treatment B'. The data available contains the information about the patient’s age and the occurrence of two symptoms: X or Y. By applying a classifier to the data of patients’ information, we can discover which entries (Age, Symptom X and Symptom Y) are associated to the classes 'treatment A' or 'treatment B'. If the classifier learned that people of age \( \leq 30 \text{ years} \) that suffer from symptom X benefit from the treatment A, future patients with these characteristics will also benefit from treatment A.

Decision tree induction is a classification technique consisting on the learning of decision trees from class-labeled training data. A decision tree is a structure where each internal node denotes an attribute, each branch node’s represents the possible outcomes for that attribute. The topmost node is called root node and the terminal/leaf node holds a class.

**Arisco System Development**

To improve the current hospital’s risk assessment process, we propose the development of a recommendation system that will be responsible for performing this process automatically. The goal of this system is to perform the risk assessment process more efficiently, reducing the process’s duration and increasing the precision of the risks evaluations. The development of this system will be separated in three different tasks:

- First, to understand the current situation of the hospital’s instrument used to perform the risk assessment, a study focused on the data sample characteristics collected was made.

- A new classification model for the risk assessment was created. This model is composed by classifiers in form of decision trees and a new reformulated questionnaire.

- Having the new classification model to perform the risk assessment, a web platform was developed to perform the risk assessment process automatically.

**Classifiers and Questionnaire**

A data sample composed by 321 evaluations from previous hospitalized patients was collected. Contrary to what was expected not all the patient’s evaluations match the hospital’s current instrument. The health professionals rather prefer perform their own risk assessment than follow the current instrument’s rules for predicting the risk. To produce a risk assessment similar to the one produced by the health professionals, decision trees classifiers were created. These decision trees will replace the current instrument’s rules to classify the patient’s risks. The decision trees were created using the C4.5 algorithm and techniques like SMOTE were used to arrange the data sample to produce efficient decision trees.

The current questionnaire was changed, and unused and duplicate questions were eliminated. To perform this process Pearson Correlation coefficient and Logistic Regression were used. The text of some questions was reformulated, so that its meaning would be less confusing and also so as to update some health-related vocabulary. The risk’s level scale was changed to only two risk’s levels: 'Very High' and 'not Very High'. It was considered important by the health professionals to predict the...
risks add new questions, and also to add a new risk category: Risk of Clinical Pathology. With the help of the health professionals and the results from the studies performed, a new smaller and simpler questionnaire was created.

**Web based system**

Having the new classification model composed by the decision trees and the new questionnaire, a web based system was developed to perform the risk assessment process automatically. Although the decision trees are used to perform the classification of the risk, the results from the risk assessment will not be displayed to the health professionals in this early stage. The system developed focus on collecting data to validate the performance of the classifiers. For that the health professionals answer the questionnaire and also perform their own risk assessment. All the data is stored: the questionnaire’s answers, the risk assessment performed by the trees classifiers and the risk assessment performed by the health professionals.

**System’s Evaluation**

**Risk Assessment Model’s Evaluation**

The model composed by the decision trees classifiers will be evaluated using the performance metrics of accuracy and sensitivity.

A decision tree was created for each one of the questionnaire’s risk category: Suicide, Self-Aggressiveness, Heteroaggressiveness and Escape. For each of these classifiers we were able to obtain the values for the metrics of Accuracy and Sensitivity presented in table 1. There are some classification errors committed by the trees classifiers considered dangerous when evaluation a mental health patients. We must be careful with the ‘Very High’ class of each risk. A patient that has the severity level of any risk as ‘Very High’ must be immediately taken care of. If these patients are classified as not being ‘Very High’ and do not receive the appropriate treatment dangerous outcomes are probable to occur.

<table>
<thead>
<tr>
<th>Risk Indicator \ Metric</th>
<th>Number of examples</th>
<th>Accuracy Hospital’s Rules</th>
<th>Accuracy Decision Trees</th>
<th>Sensivity regarding ‘Very High’ class Hospital’s Model Rules</th>
<th>Sensivity regarding ‘Very High’ class Decision Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide</td>
<td>59 VH/321</td>
<td>58.3%</td>
<td>83.49%</td>
<td>42.4%</td>
<td>72.88%</td>
</tr>
<tr>
<td>Auto-agression</td>
<td>29 VH/321</td>
<td>93.5%</td>
<td>84.74%</td>
<td>79.3%</td>
<td>82.75%</td>
</tr>
<tr>
<td>Hetero-aggression</td>
<td>33 VH/321</td>
<td>89.1%</td>
<td>94.70%</td>
<td>84.8%</td>
<td>87.88%</td>
</tr>
<tr>
<td>Escape</td>
<td>14 VH/321</td>
<td>93.8%</td>
<td>97.20%</td>
<td>71.4%</td>
<td>71.43%</td>
</tr>
</tbody>
</table>

Observing table 1 we can conclude that the current instrument is not used in all the evaluations collected. The initial values expected for these metrics were 100%, meaning that the instrument was always used when performing an evaluation. Regarding the risk of suicide, only 58.3% of the times does the risk assessment performed by the current instrument rules match the one performed by the health professionals. We conclude that the current instrument being used is not suitable and does not follow the knowledge of the health professionals, making them performe their own risk assessment ignoring its the rules.

Observing the performance values from the decision trees classifiers, almost all metrics are higher to the current hospital’s instrument. The accuracy metric of self-aggressiveness risk is lower but its sensitivity value is higher which is positive.
Having the decision tree’s metrics higher than the current instrument means that the decision trees, offer a risk assessment closer to the health professionals, than the one performed by the current instrument.

**Arisco System’s Evaluation**

To evaluate the performance of the recommendation system developed, a pilot test was performed at the Dª Estefânia Hospital, with the duration of 2 months. The nurses involved in the pilot test used the web system Arisco to perform the risk assessment.

<p>| Table 2. Resulting metrics from the pilot test and from hospitals current instrument |
|---------------------------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Number of examples</th>
<th>Accuracy</th>
<th>Sensitivity regarding 'Very High' class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide</td>
<td>8 VH/55</td>
<td>87.28%</td>
</tr>
<tr>
<td>Auto-Aggressiveness</td>
<td>6 VH/55</td>
<td>72.73%</td>
</tr>
<tr>
<td>Hetero-aggressiveness</td>
<td>9 VH/55</td>
<td>94.54%</td>
</tr>
<tr>
<td>Escape</td>
<td>4 VH/55</td>
<td>94.54%</td>
</tr>
</tbody>
</table>

A new data sample was obtained from the pilot test and it was used to perform a new evaluation to the system. This evaluation was made using the metrics of accuracy and sensitivity presented at table 2.

The Arisco system presented metric’s values for accuracy higher than the current hospital’s instrument except for self-aggressiveness risk. The classifiers presented an average precision of 87.3%, having an accuracy of 94.54% for the risks of escape and heteroaggressiveness. The trees of suicide, self-aggressiveness and heteroaggressiveness all presented a sensitivity higher than the current instrument. The escape tree presented an higher accuracy but a low sensitivity which is worrying because the decision tree did not classify well the ‘Very High’ instances presented in the data sample. It is important to consider that the number of evaluations collected in the pilot test is small comparing to the ones collected at the initial data sample. The escape tree presented a low sensitivity but in the pilot data sample there exists only 4 instances with a ‘Very High’ risk of escape. The decision tree evaluated as a low sensitivity, evaluating incorrectly 3 ‘ Very High’ instances.

Correlation studies performed using the Pearson Correlation coefficient [25] and Logistic Regression [26] were made using the pilot test’s data sample. It was possible to conclude that there still exist irrelevant questions in the new questionnaire. These questions still do not present any relations with none of the risk categories were deleted from the questionnaire.

**Conclusion**

Performing an efficient risk assessment is the key to offer good care to patients who suffer from mental diseases. Using a system that has the capability of performing this process can bring enormous improvements, not only for the life of hospitalized patients but also to health professionals.

**Contributions**

This project contributed for the improvement of the process of risk assessment currently used in the area of child and adolescent psychiatry of Dª. Estefânia Hospital. By replacing the current hospital’s pen & paper instrument by the system Arisco, the time...
consumed to perform an evaluation was decreased, the evaluation’s errors were reduced and patient’s data is stored efficiently.

The Arisco project was presented in form of a poster in the event XVII Symposium of the Portuguese Society of Suicidology in Tomar and in the event Journey of Child and Adolescent Mental Health Care on Dª. Estefânia Hospital.

Main Conclusions

The Arisco System’s development was composed by four main steps.

In the first step a research was made based on the project’s scope: risk assessment in children and adolescents mental health care. It was concluded that there exist several studies and tools to perform the risk assessment for patients that suffer from mental diseases, but not many of them focus on patients that are children and adolescents.

The project’s second step consisted in the analysis of the data sample composed by evaluations from children and adolescents hospitalized before. It was concluded that the instrument used in the hospital to perform the risk assessment was not adequate, which led to a manipulation and contempt on the use of the instrument. Statistical studies were performed, and with the help of health professionals, it was concluded that the questionnaire had irrelevant and duplicate questions. The rules used to predict the risk were also contradictory and confusing.

In the third step, new classifiers to perform the risk assessment were developed using decision trees. The goal of this step was to create decision trees that present a risk assessment similar to the health professionals assessment. After having developed these classifiers and evaluated their performance, we concluded that they offer a risk assessment closer to the opinion and knowledge of the health professionals than the current risk assessment. Besides the good performance, the tree classifiers offer a simpler and more intuitive way of classifying the risks.

The last step consisted on developing a web based system, using the new questionnaire and new classifiers to perform the risk assessment automatically. A two month pilot test in the hospital was performed. From the pilot test it was concluded that the tree classifiers developed presented positive performance evaluating the risk. The classifiers presented an average precision of 87.3%, having an accuracy of 94.54% for the risks of escape and heteroaggressiveness. The risks of Suicide, Self-Aggressiveness and Heteroaggressiveness presented positive values regarding the metric of Sensitivity (‘Very high’ cases). In the decision tree for the escape risk’s tree classifier, the metric of sensitivity was low, being the lower value obtained for the system’s performance evaluation. It can be concluded that the decision trees and the system developed performed well in the pilot test, and the feedback received from the nurses involved in the pilot test was positive.

All the proposed objectives for this project were successfully achieved, and efficient and appropriate recommendation system was developed to facilitate the process of risk assessment of Dª. Estefânia Hospital.

System Limitations and Future Work

Although all the project’s goals were achieved, there are other aspects that can be improved.

Currently, the Arisco system uses a questionnaire and returns a prediction of the level of severity for each category of risks: Suicide, Self-Aggressiveness, Heteroaggressiveness, Escape and Risk of Clinical Pathology. The type of supervision and interventions are chosen according to the risk assessment performed. It is important to understand if, after being classified with a certain level of risk, the patient had a positive outcome with the treatment chosen based on that risk prediction. Instead of
just taking in consideration the evaluation made by the health professionals to evaluate the correctness of the system, it would be interesting to, based on the risks predicted by the Arisco system, understand the patient’s crises and behaviors after being classified with a level of risk. By joining this information to Arisco system, it would be possible to understand how the patients respond to the treatments and interventions made based on the system’s evaluation.

It would also be interesting to perform a probabilistic research on how the patients evolve within the risk level assigned and the symptoms and factors they present. Studying the data samples collected, it would be possible to predict how a patient with a certain level of risk and factors will progress, if the probability of that patient with those symptoms/factors is to maintain that level of risk, increase or decrease it.

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To each and every one of you, thank you.

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8. type:. Available from: https://www.egrist.org/content/anonymous-users. 


18. Buckingham C. The GRiST decision support system for mental health risk and safety management. 2011.;


**Fig 1.** Hospital's current questionnaire English version

<table>
<thead>
<tr>
<th><strong>Identification of Clinical Risk Factors</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suicide Risk</strong></td>
</tr>
<tr>
<td>1. Suicide attempt</td>
</tr>
<tr>
<td>1.1. Disruptive (impulsive with severe method)</td>
</tr>
<tr>
<td>1.2. Recurrent</td>
</tr>
<tr>
<td>2. Maintenance of Suicidal Ideation</td>
</tr>
<tr>
<td>3. High lethality of the act (aggressive and / or planned method; intention of death expressed or inferred).</td>
</tr>
<tr>
<td>4. Mood disorder, or high impulsivity, psychoses.</td>
</tr>
<tr>
<td>5. Severe family dysfunction and / or family history of t. of suicide or suicide.</td>
</tr>
<tr>
<td>6. Major affective loss due to death or termination of a relationship of fundamental affective support, still felt strongly by the patient.</td>
</tr>
<tr>
<td>7. Serious socialization problems / social isolation.</td>
</tr>
<tr>
<td>9. History of child abuse; Substance use</td>
</tr>
<tr>
<td>10. Male</td>
</tr>
<tr>
<td><strong>Self-aggressiveness Risk</strong></td>
</tr>
<tr>
<td>1. History of maintained and recurrent self-harm behaviors.</td>
</tr>
<tr>
<td>2. Behaviors of self-aggression and existence of psychotic pathology, personality or mental weakness.</td>
</tr>
<tr>
<td>3. Self-harm behaviors with risk of suicide</td>
</tr>
<tr>
<td><strong>Hetero aggressiveness Risk</strong></td>
</tr>
<tr>
<td>1. Tense facial expression, loud and fast tone of voice, stare and threatening or avoidance of eye contact with the observer.</td>
</tr>
<tr>
<td>2. Tense / threatening posture (wrists, clenched teeth).</td>
</tr>
<tr>
<td>3. Excessive motor agitation / aggressive movements (kicks, punches to objects).</td>
</tr>
<tr>
<td>4. Aggressiveness and / or verbal threats: (sarcasm, ridicule, less forgiving references to differences, comments of contempt, mistrust, challenge).</td>
</tr>
<tr>
<td>5. Dispute and frequent breach of service rules.</td>
</tr>
<tr>
<td>6. Delusional perceptions of paranoid nature.</td>
</tr>
<tr>
<td>7. Threat of physical aggression directed at objects or people.</td>
</tr>
<tr>
<td>8. Aggressiveness expressed, physical, directed at objects or people.</td>
</tr>
<tr>
<td><strong>Escape Risk</strong></td>
</tr>
<tr>
<td>1. Low consistency in the child's and / or family's adherence to the therapeutic project.</td>
</tr>
<tr>
<td>2. Previous history of &quot;escapes&quot;</td>
</tr>
<tr>
<td>3. Previous history of additive behavior.</td>
</tr>
</tbody>
</table>