

## **ABSTRACT**

### **Development of a prototype of equipment to assist in the identification of children at risk of hearing loss in their first year of life**

This work aimed at developing a prototype of equipment (device) that may assist in the identification of children at risk of hearing loss in their first year of life, in primary care and to be used during childcare consultations in basic health units. The study was divided into two stages: the first consisted in detailing the development of the device, and the second in the calibration (measurement) in relation to the acoustic emission and comparison of heart rate variability with reference equipment on the market. In the elaboration of the device, the product development process (PDP) model which has as a process the pre-development phase (planning) and development phases, such as the detailed design description, was used; the second consisted in calibrating the device in relation to the acoustic emission, comparison of heart rate variability with equipment reference on the market - the heart rate sensor belt Polar RS800CX® (Polar Electro, Finland) - through statistical analysis and data reliability. The calibration was carried out by a company specialized in the maintenance of audiological electromedical products, ACÚSTICA ORLANDI, located in the city of Bauru. Twenty adult individuals with no hearing loss, aged 18-40 years, were selected. The heart rate capturing procedure was simultaneous, and the two equipments, the device and the polar RS800CX, were tested on the same subject, with the pulse sensor (of the device) of the heart signal attached to the finger of one hand (except the thumb), the index finger being recommended [MANUFACTURER's MANUAL - Finger pulse oximeter model onyx 9500] and the strap attached to their chest, the monitor watch being in the possession of the collector. The data generated were analyzed using the Statistical Package for Social Sciences® (SPSS) version 17.0 statistical software; the Shapiro-Wilk test, paired t-test, Wilcoxon non-parametric test, Bland-Altman test, Pearson and Spearman correlation test were employed. The results of the statistical tests showed, through the paired parametric t test for the RMSSD and SD1 indices at intensities of 50, 60, and 70 dBHL and the Willcoxon test for silence and 80 dBHL, the compatibility in the measurements made by the two devices, it is noteworthy that this result was confirmed when the agreement between the device and the POLAR RS800CX was analyzed in the measurement of the indices, through the Bland-Altman