The quality of chest compression among in-hospital staff: a study on manikin

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Purpose of the study

In-hospital cardiac arrest (IHCA) is a event with a severe outcome and mortality until now (1-2). A suddenly started, uninterrupted and high quality chest compression remains the cornerstone of the treatment (3).

The purpose of this work is to analyze the quality of chest compression performed by in-hospital staff.

Materials and methods

In this prospective observational study we enrolled a group of volunteers among in-hospital staff employed in a 500-bed hospital. **Period:** a week in October 2017 instituted by Italian Resuscitation Council (IRC) with the aim of sensitizing people about a correct chest compression (VIVA week).

Protocol: enrolled subject performed a 2-minutes chest compression sequence using a manikin (ResusciAnne®-Laerdal, Norway) with quality CPR (Q-CPR) and the skill-guide useful for feedback at the end of each performance. The device is able to record the quality of chest compression (depth, frequency and recoil) according recent guidelines (3). The quality of each performance was summarized in a single number named **compression score** (0-100%). We considered as qualitative sufficient if compression score > 75% and a high quality chest compression if > 90% as purposed in other study (4). Each performance was located in 3 groups: **low quality group (LQG)** < 75%, **medium quality group (MQG)** 75-90% and **high quality group (HQG)** > 90%. **Data collected:** age (year), weight (Kg), height (m), sex, right-handed, smoker, role (physician/nurse/other healthcare profession/non-healthcare profession), type of ward (medical/surgical/critical care/other), gap from last basic life support (BLS) course, real life experience in CPR, sedentary lifestyle and physical limitations.

Statistic: numerical data are shown as mean and standard deviation, ordinal data as percentage. ANOVA and X-square test are used to compare data. P significant if < 0.05.

Results

93 chest compression sequences were recorded. Mean compression score is 84% despite a great variability (13-100%). 11.8% in LQG, 32.3% in MQG and 55.9% in HQG. Main data are summarized in table 1.

Table 1	LQG (n 11)	MQG (n 30)	HQG (n 52)	P
Age (year)	53 ± 7 [±]	49 ± 8	45 ± 10 [±]	*0.013
Weight (Kg)	63 ± 9	64 ± 9	66 ± 11	0.30
Height (m)	1.59 ± 0.04 [±]	1.64 ± 0.08	1.67 ± 0.07 [±]	*0.006
Male	0% [±]	9.7% [±]	33.3% [±]	*0.007
Female	100% [±]	90.3% [±]	66.7% [±]	
Right-handed	0.9% [±]	3.5% [±]	83.3% [±]	0.58
Smoker	0% [±]	6.5% [±]	17.6% [±]	0.07
Gap from last basic life support course (year)	1 ± 1	1 ± 2	1 ± 2	0.97
Real life CPR	90.9% [±]	64.5% [±]	72.5% [±]	0.34
Sedentary lifestyle	45.4% [±]	32.3% [±]	21.6% [±]	0.23
Physical limitation	18% [±]	0% [±]	0% [±]	*0.003

The best chest compression sequences were performed by nurses (70.5% in high quality group) and personnel enrolled in medical and critical care wards (80.3% in high quality group) as showed in fig 1 and 2.

Fig 1 – Compression score and role

Fig 2 – Compression score and site

Conclusions

The quality of chest compression among in-hospital staff was sufficient on average. Some factors (younger age, male and higher height) positively affected the performance while physical limitations negatively.

Nurses and personnel employed in medical and critical care area practiced a more efficient chest compression but these data need further evidence.

References

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