

Background and objective:

Asthma is one of the most frequent chronic diseases affecting children and adolescents. Good compliance is indispensable for effective treatment since a suboptimal use of inhalation devices can result in decreased therapeutic efficacy and increased morbidity. The objective of this work was to evaluate the inhalation technique of paediatric patients visiting a specialized consultation clinic of a university hospital.

Design:

Observational prospective study during a 3-month period.

Setting:

Specialized consultation clinic of a university hospital.

Main outcome measures:

This study involved 40 outpatient infants, children and adolescents visiting alone or with their parent(s). Patients' data (age, sex, weight, diagnostic, reason for consulting, previous consultations) and their medicines were compiled using an ad hoc form.

Filmed sequences of the inhalation procedure used by each child were reviewed independently by members of an interdisciplinary team consisting in a physician, a pharmacist, a nurse and a physiotherapist.

A score of 1 was assigned to each correct step in the procedure, and a score of 0 to an incorrect step. A perfect procedure implied 12 correct steps.

Results:

Table 1 : Steps to assess the inhalation technique with metered-dose inhaler and spacer

1. Properly assemble the spacer
2. Shake well the metered-dose inhaler (MDI)
3. Remove cap of the MDI
4. Insert the MDI in the spacer
5. Place the patient in a correct position
6. Place the mask or the mouthpiece in a correct position
7. Press puffer down 1 time
8. Take 5 to 10 breaths
9. Inhale slowly
10. Shake well the MDI before the 2nd dose
11. Separate the 2nd dose of the first
12. Rinse face and mouth

Table 2 : Characteristics of the study group

Number of patients	40
Median (min-max) age (years)	6.4 (2.4-15.7)
Number of patients with MDI and spacer*	30
Number of patients with DPI **	10
Number of patients with 1 consultation	10
Number of patients with 2 consultations	12
Number of patients with > 2 consultations	18
Median (min-max) number of medicines	2 (1-4)

* Spacers: Babyhaler® or AeroChamber Plus®

** Dry powder inhalers (DPI): Diskus® or Turbuhaler®

Table 3 : Influence of the number of consultations and of the type of inhaler

Parameters	Mean score	
Patients with 1 consultation (n = 10)	8.0	ns*
Patients with 2 consultations (n = 12)	9.2	
Patients with > 2 consultations (n = 18)	9.0	
Patients with MDI and spacer (n = 30)	9.2	p = 0.002*
Patients with DPI (n = 10)	7.4	

* Robust linear regression

Fig. 1 : Reliability of the assessment of the videotaped inhalation technique

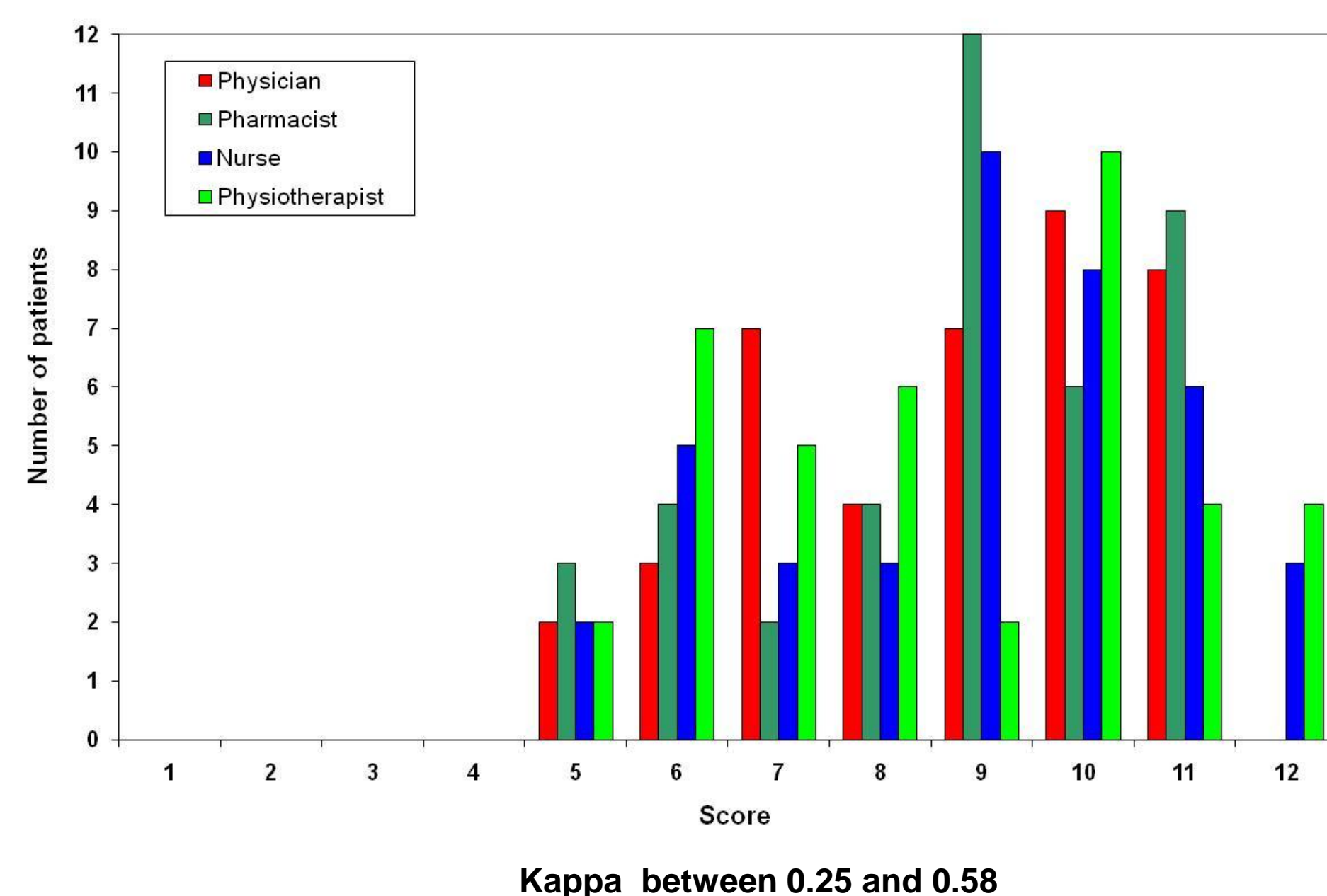


Fig. 2 : Mean score of the study group (n = 40)

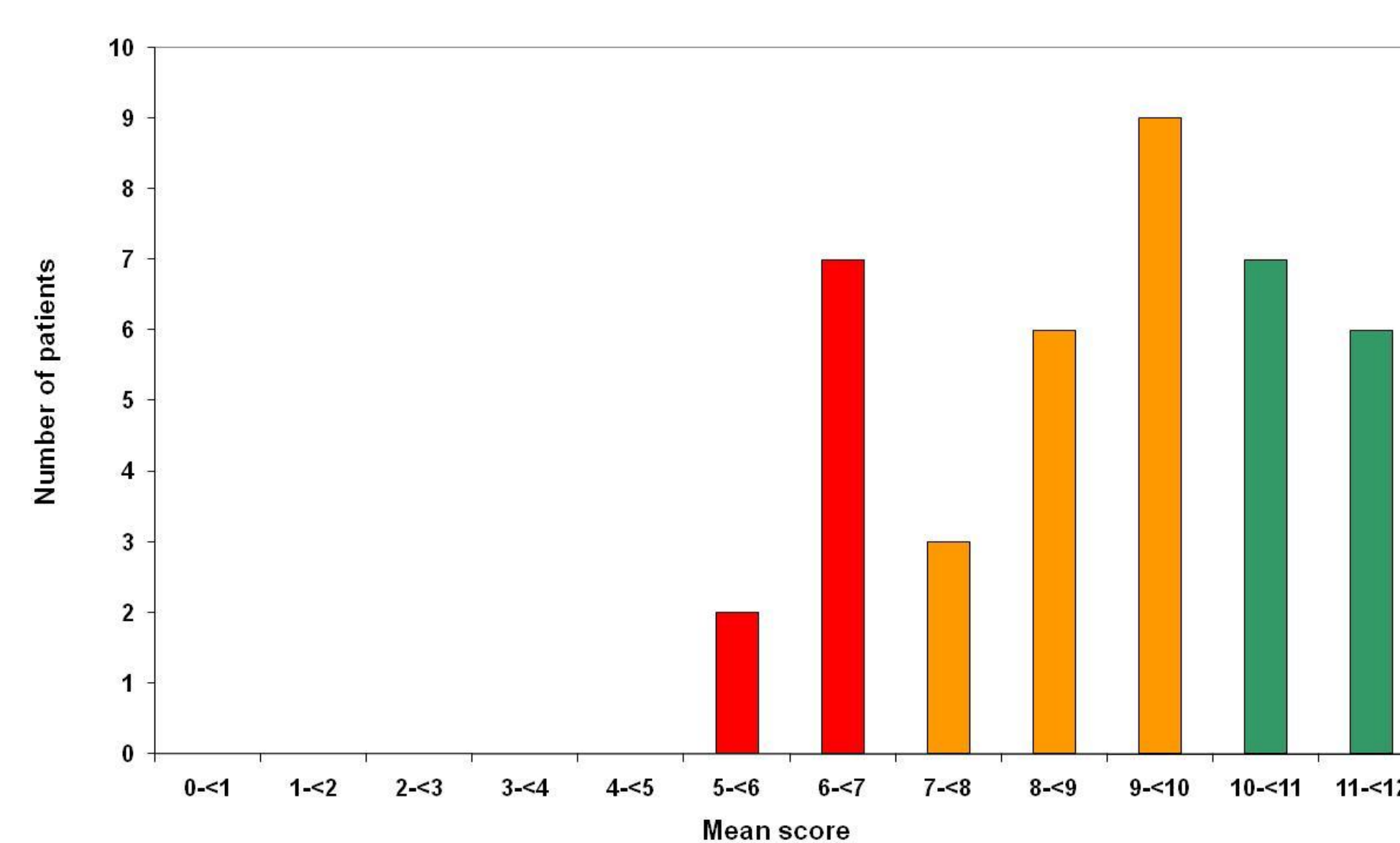


Fig. 3 : Spacers and DPI used



Conclusion:

- Video recording is a simple method to evaluate the degree of mastery of an inhalation procedure in paediatric patients.
- The method allows a convenient and efficient identification of suboptimal procedure steps by the hospital staff, and opens the way to patient-specific teaching.
- In two-thirds of juvenile patients, their inhalation technique was suboptimal despite initial training.
- This study shows conclusively that the inhalation technique in paediatric patients must be monitored during each examination, and teaching measures taken to improve it when necessary [3].

REFERENCES

- [1] Global Initiative for Asthma 2008 sur <http://www.ginasthma.com> (consulté le 15.3.09)
- [2] Walia M et al. Assessment of inhalation technique and determinants of incorrect performance among children with asthma. *Pediatric Pulmonology* 2006;41,1082-1087.
- [3] Frey U, Wildhaber J. Mon enfant doit inhaler, et maintenant? (booklet available in Switzerland).

ACKNOWLEDGEMENTS

The authors wish to thank A.-J. Bosset, A. Stoky-Hess, D. De Hepcee Dalimier and M. Faouzi.

CONFLICTS OF INTEREST

None

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