

Distribution and characteristics of Italian paediatric intermediate care units in Italy: A national survey

Paediatric intermediate care units (PIMCUs) are designed for children with complex or at-risk entities, providing advanced monitoring and therapeutic options when compared to general wards. When PIMCUs are not available, the patients may be admitted to general wards or to intensive care units with an increasing of risk or a waste of resources, respectively. Although some admission and discharge criteria have been proposed in the literature, a very few data were reported on features of these units worldwide.¹

In this paper, we present the result of a survey conducted to describe distribution and main characteristics of PIMCUs in Italy.

A link to an online questionnaire was sent to the Directors of Italian paediatric wards between October 2015 and December 2016, along with a letter describing the aim and the working group that produced the project (Appendix S1). The mailing list was collected contacting the paediatric departments or searching on their websites. A first e-mail message was sent in October 2015, a first reminder in April 2016 and a second one in December 2016. The questionnaire covered the following areas: general information and warning tools, characteristics of PIMCUs and information from centres without PIMCUs.

Out of 280 contacted centres, we received 127 (45%) filled questionnaires, ninety-seven (76%) from Northern Hospitals, twenty-one (17%) from Central Hospitals and nine (7%) from Southern Hospitals.

The Paediatric Early Warning Score was used in 20% of centres. Other adopted tools were the Glasgow Coma Score, the American Society of Anesthesiologists classification, the Paediatric Mortality Risk or local guidelines. Of note, 20% of centres did not adopt any warning score.

In terms of education and training, main reported topics of interest were the identification of at-risk children (61%) and the airway management (21%).

According to the survey, 17 PIMCUs were present in Italy, 8 (47%) in the North, 5 (29%) in the Centre and 4 (24%) in the South. Main characteristics of these units were reported in Table S1. Their median number of beds was four (range 1-22). In most centres, PIMCUs were managed by paediatricians. Nine (53%) PIMCUs were organised as an independent unit.

Sixteen PIMCUs (94%) were provided of a dedicated medical shift. Physician/patient ratio was 1:6 or more in 11 centres (65%). Nurse/patient ratio was 1:4 or more in 13 centres (76%). Caregivers' presence was allowed 24/24 hours in 88% of centres. PIMCU beds were provided of a central monitoring system in 11 centres (65%), of a mechanical ventilator in 13 (76%). A defibrillator was present in

15 (88%) PIMCUs. Main indications for admission to PIMCUs were as follows: high flow oxygenation therapy (76%), signs or symptoms of septic shock (76%), set-up of non-invasive ventilation (65%) and monitoring (59%).

In the centres without an established PIMCU, three (range 1-10) was the median number of beds indicated as desirable to admit at-risk children otherwise admitted to general paediatric wards or to paediatric intensive care units (PICUs). According to the responders, PIMCUs should be managed by paediatricians (44%), by paediatric intensivists (39%), by emergency physicians (11%) and by general intensivists (6%). In these centres, patients with PIMCU admission criteria were usually admitted to a paediatric ward (38%) or to a paediatric intensive care unit (34%).

The present study aims to provide a description of Italian PIMCUs. According to our preliminary data, they were more diffused in the Northern regions of Italy and mainly managed by staff with a paediatric background. The median reported bed capacity of Italian PIMCUs was relatively small, accounting four beds. Interestingly, these figures were somehow confirmed by clinicians working in centres without PIMCUs, who estimated a median of 3 beds satisfactory to admit children otherwise shifted to paediatric wards or to PICUs. Training to identify at-risk patients was reported as a priority need in the majority of centres. Nevertheless, only a minority of them adopted validated early warning tools, underlying that safety culture need to be further diffused. The application of these scores might promote a better knowledge and awareness among healthcare personnel about at-risk paediatric patients, increasing safety and quality of care.² Particularly, the adoption of Paediatric Early Warning Score might allow a better cost-effective strategy, especially in resource-limited hospitals.³

Although standard equipment in Italian PIMCUs appeared fairly homogeneous, there was a marked variability in terms of bed capacity and human resources. We believe this variability could be mainly related to the lack of a specific regulatory legislation in our Country.

In 2004, the American Academy of Paediatrics published guidelines about PIMCUs' admission and discharge criteria, underlying that PIMCUs should be ideally implemented within facilities provided with a paediatric intensive care unit (PICU).¹ Another official document was published in France in 2008, with the same conclusions.⁴

To our knowledge, there are no previous studies evaluating PIMCUs' characteristics in Italy. According to our survey, many aspects and clinical indications for PIMCU admission were similar to those reported by Jaimovich et al.¹

The potential impact of PIMCUs on relevant clinical outcomes still remains a controversial issue in paediatrics. A recent study compared hospitals with and without PIMCUs, evaluating the effect of these units on several PICU metrics, like length of stay, mean severity of illness of patients admitted from general wards, unplanned readmission from wards and early PICU readmission. No significant differences between the two groups in terms of PICU efficiency were reported.⁵ However, few data exist on this topic and measurable criteria to evaluate PICU admissions are necessary to better evaluate this aspect, possibly with the adoption of warning scores.

Our study had several limitations. Firstly, more than 50% of the contacted paediatric wards did not return the questionnaire. Second, we did not investigate the number and the characteristics of patients admitted in the PIMCUs during the period of the study.

However, this survey was the first attempt of describing Italian PIMCUs. Large prospective studies are warranted to evaluate their impact in improving patients' safety and quality of care, while ameliorating PICU resources utilisation.

KEYWORDS

intermediate care, paediatric care, paediatric hospitals

CONFLICT OF INTEREST

The authors have no conflict of interests to declare.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.