HOW THE EDUCATIONAL CLIMATE CAN INFLUENCE THE PSYCHOMETRIC PARAMETERS OF PRESCHOOL CHILDREN?

Aurela SALIAJ[1], Ermira KOLA[2], Lorena LAZAJ[1], Majlinda RAKIPAJ[1], Emiljana ÇORRAJ[3]

[1] Faculty of Public Health, University of Vlora, Albania

[2] Pediatric Hospital, University Hospital Centre 'Mother Theresa', Tirana, Albania

[3] Directory of Public Health, Vlora, Albania

ABSTRACT

Background: There are several environmental factors which influence the preschoolers' psychomotor development and the most considerable ones are socio-economic status and day care's learning&care environment.

Aim of this study is to assess how the change of socio-economic gradient and the quality of care environment influence the average and the differences in psychometric domains of ASQ-3 in preschoolers.

Method: We assessed the psychometric parameters of all preschoolers enrolled in some of day cares in Vlora city, Albania using the ASQ-3. We also assessed the quality of care environment according to ECERS-R and the socio-economic status upon the father's occupation.

Results: In the end of this research we found that not only a considerable percentage of preschoolers included in this study have psychomotor delays, but also that these delays and the average of psychomotor development have a significant relationship with the environment factors, as socio-economic status and care environment.

Conclusions: Children development depends more on instructing capacities of kindergartens' staff than mothers. So the public health workers should work more with mothers in this direction, focusing in the lowest socioeconomic classes.

JEL CLASSIFICATION & KEYWORDS

■ I18 ■ Psychometric parameters ■ Psychomotor development ■ Socio-economic status ■ Learning&care environment

INTRODUCTION

It is now well established that children psychomotor development depends on genetic and environmental factors as well [Gollenberg et al. 2009; Aylward et al. 2009]. We can't control or modify the genetic factors, but we can identify some of environmental ones and assess their relationship with the level of psychomotor development of preschoolers in city of Vlora, Albania. In our region we have a total lack of researches in this field and through our study we're trying to fill up this gap.

Protective factors of children development include child temperament (happy, easygoing), high self-esteem, a history of successful learning experiences, and a satisfactory emotional relationship with at least one parent/caregiver. Environmental risk factors include child abuse or neglect, poverty, homelessness, family social disorganization, and parental age, educational attainment, developmental disability, and substance abuse [William Campbell 2011]. Socioeconomic position, maternal IQ, and the learning environment are independently and positively predictive of children's cognitive development. (Aylward GP et al. 2009; Roze E et al. 2010).

Groups of low and middle SES children differed disproportionately in language and executive abilities relative to other neuro-cognitive abilities (Tong S et al. 2007; Noble, K. G et al 2007). Children from low income families and of low educated mothers are more likely to fail on several psychometric domains (Jorien M. Kerstjens et al 2009). Children from households high in socioeconomic resources enter pre-K with more well developed language and math skill but fewer behavioural problems than their disadvantaged peers. Neighbourhood quality status is related to language competence and mother's marital status to math competence (Barbarin, O et al 2006). SES explains over 30% of the variance in language, and a smaller but highly significant portion of the variance in most other systems. (Noble, K. G 2007; Hackman DA et al 2010; Jednoróg K et al. 2012)

Care environment in kindergartens, where children spend a considerable part of their days, is important too. In our country this is often the only instructional environment which is offered to support the preparation of children for the elementary school. A learning environment, which is called the third teacher in the Reggio Emilia schools (Gandini L et al. 2002), plays one of the most important roles in education and development of children. A learning environment has been broken into many aspects, such as the social/emotional environment, the behavioural environment and the physical environment (Hatice Zeynep Inan. 2009). High quality emotional and instructional interactions are more likely to lead to better outcomes for children. Thus, decisions to require more stringent standards for teachers related to their field of study or level of education may indeed lead to better outcomes for children, if these qualifications lead to higher quality emotional and instructional interactions that children experience in classrooms. (Mashburn, A. J et al 2010)

We choose the ASQ-3 test to assess the children's psychomotor development, because amongst the parent-completed questionnaires for young children, the Ages and Stages Questionnaire (ASQ-3) is currently the most widely used and recommended as part of a development monitoring system [Magpie Trial 2007; Lindsay NM 2008; Marie-Noëlle Simard et al. 2012]. It consists of 19 different questionnaires covering the age-range of 4 to 60 months. The questionnaires cover five different domains: communication, gross motor, fine motor, problem solving and personal social skills. Each domain

is assessed by six questions on developmental milestones. They are chosen so as to represent a developmental quotient of 75–100% [Squires J et al. 1997; Ages and Stages Questionnaires. Third Edition. (ASQ-3) 2009]. The ASQ-3 too is suitable for detecting motor development information that can predict school aged outcomes in cognitive development (Jan P. Piek et al 2007).

The aim of the research

To assess how the change of socio-economic gradient and the quality of care environment influence the average and the differences in psychometric domains of ASQ-3 in preschoolers at Vlora city, in order to better understand the children psychomotor development in our region and to instruct encouraging policies for groups-in-risk.

Material and methods

In this research were included all preschoolers (3-6 years) enrolled in 7 day cares (4 public and 3 private) in city of Vlora, Albania and in the Foster Care of this city. Excluding criteria were genetic disorders, mental, visual or hearing disabilities. After the measurement of children's psychometric parameters, we evaluated how these parameters differ according to the environmental factors under the study.

Measurement of psychometric parameters was done with the test Age&Stage Questtionnaries-3 (ASQ-3 Jane Squires & Diane Bricker 2009) in base of chronological age of children. The socio-economic status was based on father's occupation according to the European Socio-economic Classification (E-SEC D. Rose and E. Harrison 2010). The assessment of quality of care environment was done according to Early Care Environment Rate Scale – Revised (ECERS-R Harms, Clifford&Cryer, 2005). The Statistical Package for Social Sciences (SSPS), Windows version 17 was used for all analyses.

Results

Sample characteristics

During this research were evaluated the psychometric parameters of 251 preschool children enrolled in 7 day cares (4 public and 3 private) at Vlora city during the period of January-November 2012. All the children were above the 36 months and under the 66 ones. 208 children were assessed in public day cares, 41 children in private ones and 12 ones in the Foster Care. 128 children were male and 133 female.

Socio-economic gradient and the level of psychomotor development

In our results we have found a clear inverse relationship between socioeconomic gradient and the average psychometric scoring of children under the study, especially in the last forth classes (Table 1). The highest ASQ-3 scoring (261) was found in children whose families belong to the first socio-economic class: large employers, higher managerial and professional occupations. In the second place are ranked the children from socio-economic classes III and VI (intermediate occupation and lower supervisory and technical occupation) with respectively 245 and 248 ASQ scores. Meanwhile in the ascending order of mean psychometric scorings (238-231-228-227) there are children of classes IV-VII-VIII-IX (small employers – semi routine occupations – basic occupations – long term unemployed).

Table 1: Distribution of children's psychometric average scoring according to socio-economic classification

E-SEC classification for the children under the study	Average scoring of ASQ-3
Class 1	261
Class 2	237
Class 3	245
Class 4	238
Class 5	0
Class 6	248
Class 7	231
Class 8	228
Class 9	227
Class 0	248
r = - 0.76	**p value = 0.013**

Source: Authors

The quality of care environment

In this research we have selected with random selection 4 public and 3 private day cares in city of Vlora, Albania, located in central and peripheral areas of town. In Table 2 are shown the ECERS-R profiles of the day cares involved in this research. In the ECERS-R the average of 1 point is rated as 'inadequate', 3 points as 'minimal', 5 points as 'good' and 7 points as 'outstanding'. The average scores of all day cares involved in this research was found 4.3, which is above the 'minimum' and even near 'good'.

The subscale of ECERS-R with the highest scores in all the day cares was 'Interaction' with 5.1 scores (above 'good'). In this sector are included the supervision of children, the discipline and the collaboration among the staff. The subscales with the lowest scores were 'Language/Reasoning' and 'Activities' (respectively with 3.8 and 3.5 scores). These sectors are about learning activities (stimulating, motivating and instructing), which are offered to children by the staff.

The highest average total scores were found in the private day cares, which are above or very near to 'good' with 4.6 to 5.3 scores. The public day care had relatively lower scores, which differ from 3.5 to 4.1. The lowest scoring was found at Foster Care (2.8 – under the 'minimal'), especially in 'Language/Reasoning' and 'Activities'.

Table 2: ECERS-R Profiles of day cares under the study of Vlora, Albania ([1] = The scores of Foster Care are not included in the average scores of Vlora's day cares.)

Subscales	Average subscale scores								
	Aulona	Montesori	Binjaket	No. 10	No. 9	Teli Ndini	No. 8	Foster care [1]	Average scores
Space & Furnishing (1-8)	5	4.25	5.6	4.4	4.2	4	2.75	3.6	4.3
Personal Care Routines (9-14)	6.5	4.7	6.2	4	3.8	4.2	3.3	3.5	4.7
Language – Reasoning (15-18)	5.75	4.5	3.75	3.5	3.8	2.5	2.5	1.8	3.8
Activities (19-28)	4.2	4.1	4	2.9	4.1	3.4	1.8	1.2	3.5
Interaction (29-33)	6.4	5.6	5.2	5	3.8	4.4	5	3.8	5.1
Program structure (34-37)	5	4.75	3	3.5	3.7	3.25	5.5	2	4
Parents and staff (38-43)	4.3	6.17	4.2	5.5	4.7	3.8	3.8	4.5	4.6
Average Scores	5.3	4.9	4.6	4.1	4	3.7	3.5	2.8	**4.3**

Source: Authors

How the care environment can affect the level of psycho-motor development

In all the day care assessed there are children with delayed psychometric parameters for their age-group standards. In the Table 3 are shown the average ECERS-R scores and structure of psychometric delays for each day care.

Table 3: Distribution of delayed psychometric domains in children according to the average ECERS-R scores of day cares

	Children with no delayed psychometric domains	Children with 1 delayed psychometric domain	Children with ≥ 2 delayed psychometric domains	Children with total delayed psychomotor development
ECERS-R				
5.3	60%	27%	13%	0
4.9	42%	33%	25%	1
4.6	29%	43%	28.5%	0
4.1	37.5%	40%	23%	0
4	24%	34%	42%	0
3.7	23%	32%	45.5%	2
3.5	43%	17%	40%	0
Total = 4.3	**32%**	**33%**	**35%**	**3 = 1%**
	r=0.6, p=0.07	r=0.3, p=0.29	r= -0.86, p=0.07	

Source: Authors

Table 4: Distribution of average ASQ-3 scoring of children according to the day cares' ECERS-R scores

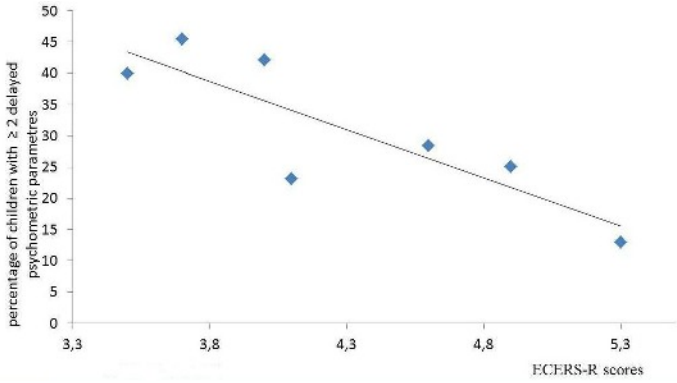
The average scoring of day cares in ECERS-R	The average scoring of children in ASQ-3
5.3	267
4.9	244
4.6	229
4.1	248
4	230
3.7	226
3.5	240
2.8	181
r = 0.81	**p value = 0.007**

Source: Authors

After the elaboration of research data we haven't found a statistically significant relationship between care environment and the percentage of children with no or only one psychometric delays. Meanwhile, the Pearson coefficient for the correlation between care environment and the percentage of children with ≥ 2 delayed psychometric parameters r = 0.81, P<0.05. Regression linear Alpha (y-intercept) = 180. Regression linear Beta (slope) = 14.

In the Table 5 are shown the percentage of delayed psychometric parameters for each domain of ASQ-3 according to the day cares where the children are educated.

Figure 1: The model of linear regresion about the impact of care&learning environment in psychomotor delays



Source: Authors

The highest percentage of psychomotor delays almost in all domains was found in 'Teli Ndini' day care (3.7 ECERS scoring). The day care 'Aulona' (5.3 ECERS scoring) had higher percentage of delays in Global and Fine motor and in Problem solving (13%). In the day cares 'Montesori', 'Teli Ndini', No.9 and No.10 the most problematic domain was Personal-social, respectively with 42%, 52%, 49% and 37.5% of delays. Two of the most problematic domains of day care 'Binjaket' were Communication and Problem solving (36%). In the day care nr.8 the highest percentage of delays was found in the Communication domain (33%).

Table 5: The percentage of psychometric parameters near and under the cut-off distributed according to the average ECERS-R scores for each day care

ECERS-R	Communication	Global motor	Fine motor	Problem solving	Personal-social
5.3	7%	13%	13%	13%	7%
4.9	25%	8%	25%	33%	42%
4.6	36%	21%	21%	36%	21%
4.1	11%	19%	17%	21%	37.5%
4	20%	15%	26%	37%	49%
3.7	36%	18%	32%	41%	52%
3.5	33%	17%	17%	27%	23%
4.3	22%	16%	23%	31%	39%

Source: Authors

The highest percentage of delays in Communication and Problem solving were found in day cares "Binjaket' and 'Teli Ndini' with respectively 36% and 41% of children with delays in these domains. Motor global had the highest percentage of delays in day care 'Binjaket' with 21%. Fine motor and Personal social had their highest percentages of delays in day cares 'Montesori' and 'Teli Ndini' (from 25% to 52%).

Discussion

In our research we found a concerning percentage of children with development delays. 35% of them had delays in more than 1 psychometric sector and this is the most problematic group. Even the percentage of preschoolers delayed only in one development area (33%) which includes children of total normal development, but which are not stimulated enough to develop their full potential, brings up a big question on the sufficiency of the informal family support or the formal institution support where the children are educated.

There are a really high percentage of the children scoring near the cut-off of all psycho-metric parameters, which again underlines the insufficient job done with these children about stimulating and motivating them into realizing the normal activities for their development stage. One of the most negative indicators of the insufficient job done with the children is the very high percentage of scoring near and under the cut-off in personal-social area (39%), where the instruction and the motivation are the main factors leading to the comprehension of the daily routines and decisions of the social interactions (Table 5).

We should be aware that ASQ-3 is a screening test and these children are considered normal and are allowed to start school with other children of their age groups. But these kids do not have the same normal capacities as their peers and might not have the same probabilities to show school results as other children. In this aspect, 35% of preschoolers who have 2 or more psychometric delays are very concerning numbers.

Regarding the evaluation of the educative environment quality of the kindergartens of Vlore city, the average scoring 4.3 in total, ranks between "sufficient" and "good", and this may be considered satisfactory for a country of the development level as Albania. But if we take account of a more detailed analysis of the classification subgroups, we will notice that the higher scores are found in areas like children supervision, allowing the free time activities according to the children wishes, or the availability of the spaces and the equipments used for the activities of global and fine movements (reflected in the lower percentages of the delays in these areas). This availability is made possible by the fact that 3 of the kindergartens under the survey are non public and 3 of the public ones had recently been restructured and equipped by state or foreign

donations. In the same time there are many concerns regarding the low scores in the communication/reasoning and the activity sections, which define the instruction and motivation of children in psychometric parameters of communication and problem solving, reflected in high percentages of the delays in these sectors.

These results are supported by the conclusions of other studies in this area [Robinson et al, 2009 Part I; Robinson et al, 2009 Part II] stating that delays of the psycho motor development of these children come from insufficient formal climate of the kindergartens where they are educated. This makes it necessary to increase the capacity of the professional staff headed toward the psycho motor stimulation of the children.

In general, analyzing the relation between the ECERS-S classification and the percentage of the children with 2 or more psycho motor delays, the trend is very clear on the decrease of this percentage according to the increase of the quality, which reinforces the results of this study or other studies done in other countries. [National Scientific Council on the Developing Child, 2007; Vandell and Wolfe 2000]

Conclusion

It is clear that in the development of psychometric parameters of a preschool child the educational environment (the socio-economic background and the instructional climate in day cares) is a crucial factor.

The analyzed data of our study do not show a statistically significant relation between the education environment and the percentage of children with one or no development delays. At the same time it is noticed that the trend is clear on the increase of the percentage of the children with delays in two or more sections with the decrease of the quality of education environment. ($r=-0.86$, $P<0.05$). The average psychomotor development of children has a strong relationship with the day cares' educational environment too ($r=0.81$, $P<0.05$).

The socioeconomic background, where the children are raised has a significant impact on their psychomotor development ($r=7$), but the instructing and motivating day care's climate seems to have a stronger influence in this kind of development ($r=8$). This leads to the conclusion that children development depends more on instructing capacities of kindergartens' staff than mothers. So the family medical staff (physicians and nurses, who are responsible for public health education) should work more with mothers in this direction, focusing in the lowest socioeconomic classes.

Anyway, the area of the psychomotor development is still an underestimated and unexplored area. It is necessary to do more scientific research in this direction using the screening or analytical studies.

REFERENCES

1. Ages and Stages Questionnaires. Third Edition. (ASQ-3): A Parent-Completed Child-Monitoring System. 2009. Stanford: Paul Brookes Publishing Company.
2. Aylward G.P. Developmental screening and assessment: what are we thinking? J Dev Behav Pediatr. 2009;30(2):169 –173.
3. Barbarin O., Bryant D., McCandies T., Burchinal M., Early D., Clifford R., Pianta R. and Howes C. (2006), Children Enrolled in Public Pre-K: The Relation of Family Life, Neighborhood Quality, and Socioeconomic Resources to Early Competence. American Journal of Orthopsychiatry, 76: 265–276. doi: 10.1037/0002-9432.76.2.265.
4. Deborah Lowe Vandell and Barbara Wolfe. Child Care Quality:Does It Matter and Does It Need to be Improved? Institute for Researchon Poverty University of Wisconsin–Madison (2000).
5. Gandini L. (2002). The story and foundations of the Reggio Emilia approach. In V.R. Fu, A.J. Stremmel, & L. T. Hill (Eds.), Teaching and learning: Collaborative exploration of the Reggio Emilia approach (pp.13-21). Upper Saddle River, New Jersey: Merrill.
6. Gollenberg A.L., Lynch C.D., Jackson L.W., McGuinness B.M. Msall M.E. Epub 2009 Dec 16. Concurrent validity of the parent-completed Ages and Stages Questionnaires, 2nd Ed. with the Bayley Scales of Infant Development II in a low-risk sample. Child Care Health Dev. 2010 Jul;36(4):485-90.
7. Hackman D.A., Farah M.J., Meaney M.J.. Nat Rev Neurosci. 2010 Sep; 11(9):651-9. Socioeconomic status and the brain: mechanistic insights from human and animal research. Trends in Cognitive Sciences, Volume 13, Issue 2, 65-73, 09 January 2009 doi:10.1016/j.tics.2008.11.003.
8. Hatice Zeynep Inan. The Third Dimension in Preschools: Preschool Environments and Classroom Design European Journal of Educational Studies 1(1), 2009.
9. Jan P. Piek, Lisa Dawson, Leigh M. Smith, Natalie Gasson, 2007. The role of early fine and gross motor development on later motor and cognitive ability School of Psychology, Curtin University of Technology, GPO Box U1987, Perth 6845, Western Australia, Australia. http://dx.doi.org/10.1016/j.humov.2007.11.002
10. Jednoróg K., Altarelli I., Monzalvo K., Fluss J., Dubois J., et al. (2012) The Influence of Socioeconomic Status on Children's Brain Structure. PLoS ONE 7(8): e42486. doi:10.1371/journal.pone.0042486
11. Jorien M. Kerstjens, Arend F. Bos, Elisabeth M.J. ten Vergert, Gea de Meer, Phillipa R. Butcher, Sijmen A. Reijneveld. Support for the global feasibility of the Ages and Stages Questionnaire as developmental screener. Early Human Development 85 (2009) 443–447.
12. Lindsay N.M. Use of the Ages and Stages Questionnaire to predict outcome after hypoxic–ischaemic encephalopathy in the neonate. J Paed Child Health 2008;44: 590–5.
13. Magpie Trial Follow-Up Study Collaborative Group. The Magpie Trial: a randomized trial comparing magnesium sulphate with placebo for pre-eclampsia. Outcome for children at 18 months. BJOG 2007;114:289–99.
14. Marie-Noëlle Simard, Thuy Mai Luu, and Julie Gosselin. Concurrent Validity of Ages and Stages Questionnaires in Preterm Infants. Pediatrics 2012; 130:1 e108-e114; published ahead of print June 11, 2012, doi:10.1542/peds.2011-3532.
15. Mashburn A.J., Pianta R.C., Hamre B.K.., Downer J.T., Barbarin O.A., Bryant D., Burchinal M., Early D.M. and Howes C. (2008), Measures of Classroom Quality in Prekindergarten and Children's Development of Academic, Language, and Social Skills. Child Development, 79: 732–749. doi: 10.1111/j.1467-8624.2008.01154.x.
16. National Scientific Council on the Developing Child. The science of early childhood development: closing the gap between what we know and what we do. http://www.developingchild.net (2007)
17. Noble K..G., McCandliss B.D. and Farah M. J. (2007), Socioeconomic gradients predict individual differences in neurocognitive abilities. Developmental Science, 10: 464–480. doi: 10.1111/j.1467-7687.2007.00600.x.
18. Robinson L.E., Goodway J.D. 2009 ResQ Exerc Sport. Instructional climates in preschool children who are at-risk. Part I: object-control skill development. 2009 Sep;80(3):533-42.
19. Robinson L.E., Rudisill M.E., Goodway J.D. 2009 Res Q Exerc Sport. Instructional climates in preschool children who are at-risk. Part II: perceived physical competence. 2009 Sep;80(3):543-51.

20. Roze E., Meijer L., Van Braeckel K.N., Ruiter S.A., Bruggink J.L., Bos A.F. 2010. Developmental trajectories from birth to school age in healthy term-born children. Pediatrics. 2010 Nov;126(5):e1134-42. Epub 2010 Oct 4.
21. Squires J., Bricker D., Potter L. Revision of a parent-completed development screening tool: Ages and Stages Questionnaires. J Pediatr Psychol 1997;22:313–28.
22. Tong S., Baghurst P., Vimpani G., McMichael A. (2007) Socioeconomic position, maternal IQ, home environment, and cognitive development. J Pediatr. 2007 Sep;151(3):284-8, 288.e1. Epub 2007 Jun 22.
23. William Campbell, MD. Developmental Delay in Children Younger Than 6 Years. Berman's Pediatric Decision Making, Elsevier Health Sciences, 2011, page 524. ISBN: 9780323054058.