Family Protective-Risk Index and its Implications

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Abstract

The study aimed to develop an index for differentiating the levels of a family at risk of affecting child development to be applied as a screening tool for primary care workers to identify families that need urgent help. The Family Protective-Risk Index (FPRI) was developed from 8 family factors; i.e. mother's education, father's education, family income sufficiency, type of family, family relations, stressful life events in the family, child rearing and physical environment at home that were related to child development in any age group (1-<3 years, 3-<6 years and 6-12 years). Each factor was given a score of 0 or 1 and the scores of FPRI were between 0-8. The family with a lower FPRI score would have a higher risk while the family with a high FPRI score would have more security. The cut off point of FPRI was determined by calculating the sensitivity, specificity, positive predictive value, and negative predictive value. It was later found that the appropriate cut off point for prediction was 6. The 6th FPRI score had a suitable sensitivity to be used for identifying families that need close assistance in order to prevent the slow growth and development of children.

Key word : Family, Protective Factor, Risk, Child Development

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The family is the first and most important environment for child growth and development as it provides all the fundamental needs for living and development. Thus, different family characteristics and environments will result in different child growth and development[1-4]. During the past ten years, there

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have been several structural changes within Thai families, for instance, there have been more nuclear or single families[5,6]. This type of family provides both advantages and disadvantages; for example, the single family may have more freedom but lack social support from relatives. Besides, families whose parents work outside may increase the need to leave children at child care centers or with grandparents[5]. Furthermore, the socio-economics status of a family also affects the growth and development of children. For instance, the age of the parents can reflect the maturity and readiness in child caring, and good education will enable parents to be connected to knowledge, information and opportunities to choose their careers. On the contrary, low-educated parents are likely to work in the labor force with low income leading to unhygienic surroundings and a lack of time to seek additional knowledge and interact properly with their children. This kind of family is vulnerable and at a high risk[7-11]. Family relations; e.g. treating each other nicely physically, verbally and emotionally, is one of the important factors leading to family happiness, whereas improper family relations will lead to violence and behavioral reorientation of family members. A family with good relations will be able to maintain its balance and prevent a family crisis when facing threatening situations[12-15].

Several factors affect child growth and development. A family at high risk will be more vulnerable to slow child development affecting the life quality of children. For a family with high protective factors or high ability to look after family members, the quality of life of family members, especially children, will then be good. Therefore, if family factors affecting child development are compiled and developed as group indicators, it will be possible to classify families at different levels of protection and risk. This will enable primary health workers to identify the families with a great need for urgent assistance.

METHOD

The survey on the development of children aged 1-12 years and family factors was conducted in 4 provinces; namely, Buri Ram, Phrae, Saraburi and Bangkok from April to September 2000. The target group consisted of a total of 669 children, of which 184 were aged 1-<3 years, 238 were aged 3-<6 years and 247 were aged 6-12 years. The Denver II[16] Method was used to measure the development of children younger than 6 years while the Colored Progressive Matrices (CPM) and Standard Progressive Matrices (SPM)[17,18] were used for measuring the intellectual development of children aged 6 to 12 years.

There were 8 family factors used to develop the Family Protective-Risk Index (FPRI), namely, father's education, mother's education, income sufficiency, family type, stressful life events in family, child rearing, family relations and physical environment within the family. The questionnaire on child rearing was developed from the concept response to basic needs and services for children developed by the National Youth Bureau[19] (20 questions; practicing 80% or more means appropriate or good rearing). The questionnaire on physical environment of a family; e.g., house security, livability, procurement of toys to improve child development, was modified from Bradley and Caldwell's concept[20]. The investigation of this aspect was collected by visiting (the questionnaire consisted of 18 questions, if at least 60% of conditions was met, environment was good). The data on family relations was obtained from talking to care takers of the children on the atmosphere at home.

The factors mentioned above were related to child development at any age group; thus, these 8 factors were used to develop the FPRI that would affect the level of child development, given that the following criteria were provided:

Variables	0 score (risk)	1 score (protective)
1. Rearing method	Not good/ moderate	Good
2. Physical environment at home	Not good	Good
3. Stressful life events in the family	Yes	No
4. Father's education	Primary education or lower	Higher than primary education
5. Mother's education	Primary education or lower	Higher than primary education
6. Family income sufficiency	No	Yes
7. Family type	Nuclear	Extended
8. Family relations	Not good	Loving each other

To score each of the 8 family factors, it was assumed that all 8 factors had the same weight as they were important for child growth and development. Thus, the total scores of the FPRI was 0-8, which meant that families with low FPRI scores would be vulnerable and at high risk and that children will have slow development, whereas families with high FPRI scores would be highly secure and their children would develop to full capacity.

RESULTS

From the total scores of the FPRI, it was found that there were 2 families with a FPRI score of 0 which was considered at highest risk and 6.9 per cent had scores of 8. Analytical results of child development in families with FPRI scores from 8 to 0 showed that families with low FPRI scores were likely to have a high proportion of children with slow development (Table 1).

After that, the cut off point of FPRI at each level was determined to identify the risk levels of families that affect child development by calculating the sensitivity, specificity, positive predictive value (PPV) and negative predictive values (NPV)[21] as shown in Table 2. It was found that an FPRI score of 6 was the appropriate turning point for screening families at risk, especially for children aged 3 years and more because the screening tool should have high sensitivity and a low false negative. In other words, children with slow development should be identified by this tool as it prevents improper child development in the future. Although screening by this tool might include children with normal development but identify them as those with slow development or a false positive, it provides an advantage in that families can be followed-up and child development closely promoted. Besides, the tool should have a high positive predictive value; i.e., able to identify children with slow development precisely in order to reduce the growth and development problem by early stimulation.

DISCUSSION

Family status and child rearing methods affect child growth and development. Each factor is related to all the others. Highly educated parents would have more opportunity to have a well-paid career, providing sufficient income for the family to meet the needs of their children. At the same time, a high level of education enables parents to think wisely and have access to various information sources including knowledge on child development promotion. Thus, they could look after their children well and provide a physical environment in the family that supported appropriate child development[3,4,7]. Similarly, a good career and education could also create skills to cope with family pressure effectively which will prevent a family crisis[3,13] resulting in a balance of family atmosphere and good relations. These would positively affect child growth and development[12-14,22].

Therefore, for a family lacking the above mentioned factors, child growth and development would be more negatively affected[23]. As a result of health care reform in Thailand that focuses more on health development than treatment[24], it is neces-

Table 1. Distribution of intellectual development levels of each age group, classified by FPRI scores.

FPRI score	1-<3 years (n = 184)		3-<6 years (n = 238)		6-12 years (n = 247)		Total	
	SD	Normal	SD	Normal	BA	AA	n	%
8	1	14	3	17	2	9	46	6.9
7	9	30	14	38	12	33	136	20.3
6	5	30	15	29	13	32	124	18.5
5	5	30	24	20	22	27	128	19.1
4	11	17	25	11	23	21	108	16.2
3	9	17	22	9	19	15	91	13.6
2	0	3	6	1	12	5	27	4.0
1	2	0	2	1	1	1	7	1.1
0	0	1	0	1	-	-	2	0.3
Total	42	142	111	127	104	143	669	100.0

Note: SD = suspected delayed, BA = below average, AA = average and above

Table 2. Sensitivity, specificity, positive predictive value and negative predictive value of different FPRI cut off points that affected the growth development of children aged 1-<3, 3-<6 and 6-12 years

Value	FRRI score					
	8	7	6	5	4	3
Age 1-<3 years (n = 184)						
Sensitivity	97.6	76.2	64.3	52.4	26.2	4.8
Specificity	9.0	31.0	52.1	73.2	85.2	97.2
PPV	24.3	24.6	28.4	36.7	34.4	33.3
NPV	93.3	81.5	83.1	83.9	79.6	77.5
Age 3-<6 years (n = 238)						
Sensitivity	97.3	84.7	71.1	49.5	27.0	7.2
Specificity	13.4	43.3	66.1	81.9	90.6	97.6
PPV	49.5	56.6	64.7	70.5	71.4	72.7
NPV	85.0	76.3	72.4	65.0	58.7	54.6
Age 6-12 years (n = 247)						
Sensitivity	98.0	86.5	74.0	52.9	29.8	12.5
Specificity	6.3	29.4	51.7	70.6	85.3	95.8
PPV	43.2	47.1	52.7	56.7	59.6	76.4
NPV	81.8	75.0	73.3	67.3	62.6	60.0

Note : PPV = Positive predictive value, NPV = Negative predictive value

sary to actively identify the families at risk of slow child development in order to prevent and solve the problem at the beginning. According to the Convention on the Rights of a Child[25], every child is to be cared for, protected, developed, and given opportunities to participate in activities. Thailand has successfully implemented the child survival programs as evidenced by the reduction of the child mortality rate from 26.1 per 1,000 live births in 1995[26] to 20.6 in 2000[27]. However, there is still a need for accelerated development in other aspects. Appropriate care within a conducive environment will support the intellectual development of children[7,14,15,20]. Development of the FPRI will assist local health workers to identify the families at risk of slow child development and prevent problems that may arise by providing knowledge on child development to parents, and consultation or counseling to families facing family crises and on the development of family relations. Furthermore, family members should be aware of their roles and should coordinate with other organizations to seek support for better careers with sufficient income and higher education.

Nevertheless, an additional study on development of the FPRI with high sensitivity and specificity should be conducted and the variables used as an index should be easy for data collecting and feasible at the local level.

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ตัวชี้วัดปัจจัยปกป้องและปัจจัยเสี่ยงของครอบครัว และการนำไปใช้ประโยชน์

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วัตถุประสงค์ของการศึกษาครั้งนี้คือการพัฒนาตัวชี้วัดกลุ่มที่จะใช้แยกแยะครอบครัวเสี่ยงในระดับต่าง ๆ ที่จะส่งผลกระทบต่อพัฒนาการเด็ก เพื่อเป็นเครื่องมือในการปฏิบัติงานของเจ้าหน้าที่สาธารณสุขระดับต้น ในการค้นหาครอบครัวที่ควรได้รับความช่วยเหลือเร่งด่วน โดยนำปัจจัยครอบครัว 8 ปัจจัยที่มีความสัมพันธ์กับระดับพัฒนาการเด็กในกลุ่มอายุใดอายุหนึ่ง (1-<3 ปี, 3->6 ปี, 6-12 ปี) มาสร้างเป็นตัวชี้วัด เรียกว่า Family Protective-Risk Index (FPRI) ซึ่งได้แก่ การศึกษาของมารดา การศึกษาของบิดา ความเพียงพอของรายได้ครอบครัว ลักษณะครอบครัว สัมพันธภาพในครอบครัว ภาวะวิกฤตของครอบครัว วิธีเลี้ยงดูเด็ก และสิ่งแวดล้อมเชิงกายภาพของบ้าน จากการให้คะแนนแต่ละปัจจัยเป็น 0 และ 1 คะแนน คะแนนของ FPRI จะมีค่าระหว่าง 0-8 โดยครอบครัวที่มีค่า FPRI น้อยจัดเป็นครอบครัวที่เสี่ยงมาก ครอบครัวที่มีค่า FPRI สูงจัดเป็นครอบครัวที่มั่นคง กำหนดจุดตัดค่า FPRI ในระดับต่าง ๆ ที่จะทำนายระดับพัฒนาการเด็กได้แม่นยำ โดยคำนวณค่า Sensitivity, Specificity, Positive predictive value, Negative predictive value พบว่าค่า FPRI ที่ 6 คะแนนเป็นจุดตัดที่มีความไวพอควรที่จะใช้ค้นหาครอบครัวที่ควรได้รับความช่วยเหลืออย่างใกล้ชิด เพื่อไม่ให้ส่งผลต่อการเกิดเด็กพัฒนาการล่าช้า

คำสำคัญ : ครอบครัว, ปัจจัยปกป้อง, ปัจจัยเสี่ยง, พัฒนาการเด็ก

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