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Psychometric evaluation of the family APGAR Scale in a Polish population: Reliability, validity, and factor structure[1]

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Abstract: The main objective of the study was to adapt the Family APGAR by Smilkstein to the Polish reality and check its reliability and validity for the purpose of the diagnostic properties of this tool and scientific research. FAPGAR is a self-descriptive, paper-pencil type questionnaire. It consists of five statements concerning the functioning of the family in five domains: Adaptability, Partnership, Growth, Affection and Resolve. 312 adults (156 women and 156 men) in married couples from one year to 35 years of married life were studied. The studies also used the Spanier's Dyadic Adjustment Scale (abbr. DAS) and the Family Rating Scale (abbr. SOR) based on Flexibility and Cohesion Evaluation Scales (abbr. FACES-IV) by Olson. The validity and reliability of the scale were analysed by appropriate statistical methods. The results obtained with its assistance are significantly correlated with the results of measuring the functioning of the family by other methods. It can be concluded that FAPGAR has obtained satisfactory indicators of reliability and relevance. The results showed that FAPGAR can be used in the Polish market for both scientific research and clinical work. It may be particularly useful for physicians and health care professionals for screening and initial diagnosis of the functioning of patients.
Keywords: Family APGAR, polish, questionnaire, reliability, validity

1. Introduction

The functioning amongst the closest people has not only a significant impact on the sense of satisfaction of the above-mentioned domains and the overall sense of life satisfaction, but also has a link to the general health (Blum et al., 2000; Gau et al., 2012; Goodwin, 1992; Hang & Steinbach, 2018; Kim & Mitriani, 2019; Nan et al., 2013; Santesteban-Echarri et al., 2018; Wang & Huang, 2016). For the health system to function effectively, the correct and timely assessment of the family functioning facilitates the diagnosis and a professional assistance planning. The Family APGAR (FAPGAR), was presented by Smilkstein (1978) and in retrospect it seems that its design and theoretical scope have passed a practical application. The name of the test as Family APGAR, refers to the design of the test, which allows to evaluate the functioning of the family in five domains: (1) Adaptability – understood as the use of family and from outside the family resources to solving problems and addressing stressful and critical situations; (2) Partnership – understood as joint decision-making and taking responsibility for those decisions by all members of the family; (3) Growth – understood as physical and emotional self-realization achieved through mutual support and assistance; (4) Affection – relationship of mutual love and care and exhibition of love and care, and (5) Resolve – spending time with the family – understood as a commitment to dedicate and protect time to other family members.

1 Article in Polish language: https://stowarzyszeniefidesetratio.pl/fer/63P_Tuszy.pdf

FAPGAR was created in 1978 and the author's intention was to enable a quick assessment of the current family functioning. The author foresaw the use of this questionnaire both to assess the family situation as a whole as well as the relationship between spouses, with another important person, with the parent or parents, with the child or with the children (Smilkstein, 1978). FAPGAR therefore can be applied to the assessment of one's functioning in relation to the person or persons whom the person concerned consider being close to oneself. The author deliberately applied simplicity of form and easiness of application to allow family doctors and other specialists to be able to use it as an early diagnostic tool. In Poland, there are many tools to study the functioning of the family system in Poland, including both Polish and adapted tools, e.g. based on the Circumplex Olson Model, SOR (based on FACES IV) or Spanier's DAS, but it does not seem that they were suitable for screening diagnosis and for a brief evaluation for use e.g. by a physician. FAPGAR is a dedicated tool to be used in such situations, hence the efforts made to implement it in Poland.

However, there is a dispute in the literature regarding the legitimacy of further work on this tool and its further use in screening diagnostics. Based on the research, also from recent years, it can be said that other authors (Benitez & Caballero, 2017; Castilla et al., 2014; Gutierrez-Mata et al., 2017; Lim et al., 2012; Nan et al., 2014; Odume, 2015; Okeafor & Chukwujekwu, 2017; Özcan et al., 2011; Penserga et al., 2012; Shapiro et al., 1987; Silva et al., 2014; Takeda et al., 2017; Takenaka & Ban, 2016) confirm usefulness of this diagnostic tool. However, many researchers have not found consistency of the score with assessment of family functioning by therapists and did not find support for using the measurement tool (Gardner et al., 2001; Mengel, 1987; Smucker et al., 1995). Gardner et al. (2001) argue that this method is not sufficiently accurate to warrant its application to the assessment of the family situation. Amongst reports there are analyses questioning accuracy of FAPGAR (Gardner et al., 2001; Murphy et al., 1998; Smucker et al., 1995; Yaphe, 2013). The main allegations are the lack of compatibility between the FAPGAR result and results obtained through other methods used by family doctors or paediatricians to assess family dysfunctions. At the same time, it should be emphasised that the use of this method to assess marital dyadic or other close relationships is not criticised by them and is justified from the clinical practice point of view and theoretical assumptions. Also, Murphy et al. (1998) identified FAPGAR as a tool 'insensitive' to children's psychosocial problems and Smucker et al. (1995) suggest that the relationship between FAPGAR results and the physician's detection of children's psychosocial problems was poor. Yaphe (2013) stated that there is evidence that FAPGAR has neither diagnostic nor predictive value but there are no metanalysis of research results that could support this thesis. According to him, several studies in large research networks showed that FAPGAR results have little relevance to family dysfunctions and are weak predictors of family outcomes over time. In this way, he began discussing the diagnostic value of FAPGAR by formulating a provocative question, 'is FAPGAR a dead tool'? In summary, he found that this tool did not fit the reality of the diagnosis of the 21st century Portuguese family, while encouraging researchers to verify it in various research situations: 'I will be happy to share my collected references with any researcher willing to systematically review this topic' (p. 15). In conclusion, it can be said that in recent years, doubts have been raised in subject literature as to the diagnostic value of FAPGAR. On the other hand, some studies emphasize its usefulness and satisfactory psychometric properties, especially in screening studies of family functioning. These are works from the last century (Bellón Saameño et al., 1996; DelVecchio Good et al., 1979; Foulke et al., 1988; Hilliard et al., 1986; Smilkstein et al., 1982) and new studies made after 2000 (Castilla et al., 2014; Mayorga-Muñoz et al., 2019; Powazki & Walsh, 2020; Silva et al., 2014; Takenaka & Ban, 2016). FAPGAR correlates with other indices of family functioning, such as the Pless-Satterwhite FF Index (DelVecchio Good et al, 1979; Smilksten et al., 1982; Ko et al., 2015).

Due to divergent opinions regarding the usefulness and diagnostic value of FAPGAR, there are two objectives of this paper: firstly, to present the results of adapting the tool to the Polish conditions; secondly to contribute to the ongoing discussion concerning the legitimacy of the continued use of the scale in the study of the functioning of the family system.

2. Methods

2.1. Study design

In order to achieve the goals, the reliability of FAPGAR was analyzed and the results were compared with other measures of the functioning of the family system. 312 people took part in the studies (N = 312, NW = 156, NM = 156). The full socio-demographic characteristics of the test group are presented in table 1. Group selection was carried out using the snowball method, which is a recognized procedure in exploratory research. Due to the fact that the aim of the project was not to test the theory but to test the tool, it is a method acceptable in this type of research (Babbie, 2016). Volunteers did not receive any remuneration for participating in the study.

The studied male and female groups were very similar in terms of number of children, marital duration, and financial situation assessment (the Pearsons Chi-Square Test did not demonstrate the differences between these groups). There was a statistically significant difference in education level between women and men ($\chi 2 = 15.94$, $p = .003$). In a group of women, the vast majority had academic education, whereas amongst men there was also a group of people with secondary and vocational education.

The studies used an adapted method, i.e. FAPGAR (Smilkstein, 1978). In the original version, the questionnaire consists of five test items, and the answers are evaluated on the 3 – stage scale of Likert, where: 0 – *almost never*, 1 – *sometimes*, 2 – *almost always*. In the instructions, the investigator is asked to respond to the statements given, assessing the satisfaction of his family. The overall score is the sum of the points earned in each question. Each of its five questions is ranked from 0 to 10 points, and the final score, translated by the sum of the partial scores, classifies families as being *severely dysfunctional* – 0 to 3 points, *moderately functional* – 4 to 6 points and *highly functional* – 7 to 10 points. In addition, the answers to the individual questions give results in specific, five scales such as: adaptability, partnership, growth, affection and resolve (Smilkstein, 1978; Smilkstein et al., 1982). In Poland, this method was rarely used so far and there was no clear version of the translation and adaptation (Pytlińska, 2010). The original version has good psychometric properties. The *C*ronbach's α coefficients for individual scales and overall result are within the range .80 to .85 (Smilkstein et al., 1982). At the same time, the authors indicate that the questionnaire has a single-factor design (Kroplewski et al., 2019).

Table 1. Characteristics of the research group

	Women		Men		Test Value	p
	M	SD	M	SD		
age	41.6	11.65	42.4	11.85	.061	.541
number of children	*N*	*%*	*N*	*%*		
none	28	17.95	28	17.95		
1	36	23.08	38	24.36		
2	45	28.85	44	28.21		
3	21	13.46	20	12.82	.09	.999
4	13	8.33	13	8.33		
5	4	2.56	4	2.56		
6	9	5.77	9	5.77		
level of education	*N*	*%*	*N*	*%*		
primary	2	1.28	1	0.64		
vocational	12	7.69	23	14.74		
secondary	28	17.95	49	31.41	15.94	.003
post-secondary	18	11.54	8	5.13		
academic	96	61.54	75	48.08		
marital duration	*N*	*%*	*N*	*%*		
0-5 years	33	21.15	30	19.23		
6-10 years	23	14.74	23	14.74		
11-20 years	46	29.49	50	32.05	.33	.988
21-30 years	33	21.15	33	21.15		
31 & more	21	13.46	20	18.82		
financial situation	*N*	*%*	*N*	*%*		
very good	0	0	2	1.28		
good	4	2.56	2	1.28		
average	51	32.69	53	33.97	2.78	.594
poor	72	46.15	69	44.23		
very poor	29	18.59	30	19.23		

2.2. Measures

In relevance studies, FAPGAR was used by Spanier's DAS in the Polish adaptation, a useful measure of adjustment in relation (Gottman & Silver, 2000; Graham et al., 2006; Hunsley et al., 1995). DAS is a method of measuring the quality of a close relationship developed by Spanier (1976) and is readily used in numerous studies. This self- applied scale has 32 related items measuring the degree of

partner satisfaction. High scores indicate greater satisfaction, and low scores indicate conflict between the couple. High reliability was confirmed for the overall scale. Spanier (1976) reports the range of coefficients of integrity from .73 to .94. In Polish studies, the coefficient of integrity varies from .67 to .89 (Cieśla, 1989). This scale consists of 32 items, to which a respondent applies himself/herself on the Likert scale and allows the study of four aspects of adaptation in the dyad i.e.: Dyadic Consensus, Dyadic Satisfaction, Affectional Expression, Dyadic Cohesion and general result. The extent of the Spanier's DAS in the Polish adaptation of Cieślak (1989) has a rather diverse form, which, however, proves to be a favourable feature of the tool, not allowing automating the selection of answers. The test allows the obtaining a general result included as the sum of points for answers given to individual questions. This result is in the range of 0 to 151 points and temporary Polish standards in the stens were established. In addition, results can be viewed on the following subscales: (1) Dyadic Consensus – from 0 to 65 points; (2) Dyadic Cohesion from 0 to 24 points; (3) Dyadic Satisfaction from 0 to 50 points; (4) Affectional Expression – from 0 to 12 points. The method has satisfactory psychometric indicators. Spanier (1976) says that the reliability coefficients are within the range of *C*ronbach's α within the limits .73-.94. In Polish studies, the reliability coefficient varies from .67 to .89 (Cieślak, 1989).

The selection of the second relevance test tool – Family Rating Scale (SOR) by Margasiński (2009), a tool based on the Circumplex Model by Olson and the FACES IV [Olson, 2011), powerful tool in both research and clinical settings, designed to be administered to families across the life cycle, was determined by the results of the analysis of literature, suggesting that the dimensions measured by both tools can be linked (Foulke et al., 1988; Clover et al., 1989). FACES IV is administered to assess the particular strength and growth areas of the family (Olson, 2019). Since such attempts have not yet been undertaken in Poland, the authors of the work have decided to use this tool in the analysis of the theoretical relevance of FAPGAR. The questionnaire consists of 62 claims to which the responder applies himself/herself in the 5-stage Likert scale, starting with *completely disagree* and finishing with *completely agree* These assertions form eight scales. Six of them are the main scales of the Olson (2011) Circumplex Model, concerning the two dimensions of the family's functioning – (1) Cohesion and (2) Flexibility (balanced cohesion, balanced flexibility, disengagement, enmeshment, rigidity and chaos). The other two scales measure (3) Communication (which is the third dimension of the circumplex model); and (4) Family Life Satisfaction. In addition to the specific scales' results there can also be achieved three complex indicators: cohesion, flexibility and general, which is a measure of the proper family functioning. The *C*ronbach's α ratios for the original FACES IV scales are within the limits .77 to .89 (Olson & Gorall, 2003). The reliability indicators for SOR scales are somewhat lower, however satisfactory as they are within the range .70 to .93 by *C*ronbach's α (Olson, 2011).

2.3. Procedure

In the first stage, an experimental version of the tool was created. To this end, the tool was translated by three independent translators, including one native speaker, from English to Polish. Three other translators then made the required correct methodological approach to reverse translation. Finally, the versions were compared and the final wording of the items (Van de Vijver & Poortinga, 1997) was determined. In the second stage, studies were carried out to estimate the structure of the experimental tool version, its internal compatibility and theoretical relevance.

2.4. Statistical analysis

Pearson's Chi-Square test (except for the age variable) was used to test the significance of differences between the sociodemographic variables. In the following, the *C*ronbach's α method, confirmatory factor analysis (abbr. CFA) and correlation analysis were used. The calculations were made using the SPSS and Statistica programs. CFA was performed at Amos 18.

Table 2. FAPGAR – descriptive statistics.

GROUP	M			SD			Q1			Q3			R			As			K		
	Total	W	M	Total	W	M	Total	W	M	Total	W	M	Total	W	M	Total	W	M	Total	W	M
Adaptability	1.73	1.67	1.79	.48	.53	.4	1.50	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	-1.50	-1.37	-1.47	1.23	.94	.17
Partnership	1.57	1.51	1.62	.54	.56	.51	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	-.72	-.6	-.82	-.64	-.67	-.65
Growth	1.67	1.62	1.71	.53	.56	.49	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	-1.30	-1.16	-1.46	.73	.38	1.15
Affection	1.42	1.37	1.46	.59	.62	.56	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	-.47	-.48	-.4	-.66	-.63	-.84
Resolve	1.46	1.36	1.55	.61	.64	.55	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	-.66	-.51	-.76	-.52	-.65	-.45
General Result	7.85	7.55	8.15	2.02	2.19	1.78	7.00	6.00	7.00	10.00	10.00	10.00	10.00	10.00	10.00	-.91	-.87	-.8	.71	.78	-.29

R – range, As – skewness, K – kurtosis.

3. Results

3.1. Averages and Standard Deviations

Based on the studies carried out the average results and standard deviation for the individual scales and the general score were determined. All analysis results are shown in Table 2.

The average overall result (General Result) obtained by the studied persons is 7.85 (SD = 2.02). The results in each scale are: adaptability – M = 1.73, SD = .48, partnership – M = 1.57, SD = .54, growth – M = 1.67, SD =. 53, affection – M = 1.42, SD = .59, resolve – M = 1.46, SD = .41. For the overall result, the skewness indicator is .92 and the kurtosis – .71.

3.2. Internal consistency (α – Cronbach)

In order to estimate the reliability of FAPGAR, the internal consistency method *C*ronbach's α was used. The results of the internal consistency analysis are presented in Table 3.

The coefficient of reliability of *C*ronbach's α for the adaptive FAPGAR is .78 (Table 3), suggesting acceptable level of reliability measured by the internal compliance method (Nunnally, 1978).

The following examination was carried out to check whether there is an item who has a higher coefficient when one is excluded. The reliability of the individual items is presented in Table 4.

The results of the internal consistency analysis of each item (Table 4) indicate a significant contribution of each item to the scale structure and the

Table 3. FAPGAR – Internal consistency and Scale statistics / Summary of scale statistics.

GROUP	Total	Women	Men
M	7.85	7.55	8.15
Sum	2450	1178	1272
SD	2.02	2.19	1.78
Variance	4.09	4.81	3.2
Skewness	-.91	-.87	-.8
Kurtosis	.71	.78	-.29
Min	0	0	4
Max	10	10	10
*C*ronbach's α	.78	.8	.74
Standardized Cronbach's α	.78	.8	.75
Average correlation between headings	.42	.45	.38

Table 4. FAPGAR – Reliability statistics – item statistics.

	R			R2			α		
GROUP	Total	W	M	Total	W	M	Total	W	M
Adaptability	.52	.47	.48	.28	.26	.24	.75	.77	.71
Partnership	.63	.62	.55	.4	.45	.33	.72	.72	.68
Growth	.51	.55	.53	.28	.35	.29	.75	.74	.69
Affection	.58	.53	.53	.34	.35	.31	.73	.75	.69
Resolve	.55	.62	.47	.32	.42	.24	.74	.72	.71

R-Correlation Position-whole (discriminatory power of position), R2-Multiple R-squared (co-efficient of multiple determination), α – Cronbach scale after the removal of a given position/Item.

Table 5. Goodness of Fit Statistics – general (Total) and gender specific (W & M).

		Total	W & M
Default model	AIC	25.429	57.329
Saturated model	AIC	30.000	60.000
Independence model	AIC	201.041	362.891
Normed Fit Index	NFI	.993	.961
Comparative Fit Index	CFI	1.000	.983
Relative Fit Index	RFI	.975	.903
Critical N	CN	744	331
Standardized RMR	SRMR	.0151	.0324
RMSEA (confidence interval 90%)		.000 (.000-.108)	.049 (.000-.093)
Goodness of Fit Index	GFI	.996	.982
Adjusted Goodness of Fit Index	AGFI	.979	.931
relative chi-square (χ2/df)	CMIN/ DF	.476	1.666

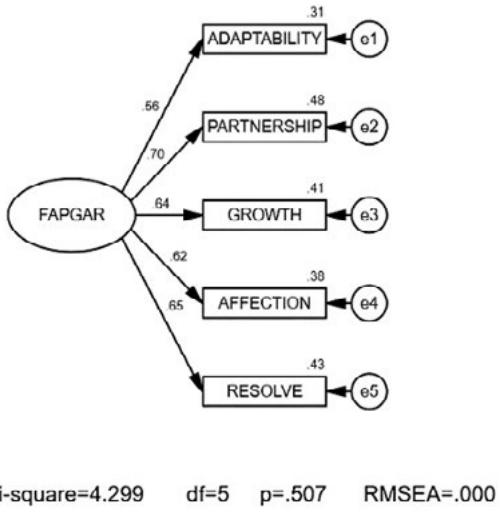

Figure 1. FAPGAR – Confirmatory Factor Analysis.

removal of any of them would reduce the reliability of the scale. Each item has a good discriminatory effect (above .5), and the Partnership and Affection positions have proved particularly relevant to the internal coherence of the tool.

3.3. Theoretical relevance – factorial analysis

A confirmation analysis was conducted to verify the factor structure of the questionnaire. The results of the CFA confirm the accuracy of the method, indicating its single factor theoretically assumed structure (Figure 1). CFA results testify to a good match of the hypothetical model to input data (Table 5).

Including the gender variable in the model showed that the model did not fit the data (significant chi-square and insufficient values of other goodness of fit indices). Detailed analysis of the calculations for the initial (basic) model, especially taking into account the corrections suggested by the computational program (modification index – AMOS) for the model – showed the introduction of correlation between errors (residuals, specific variance – unique variables) of the Growth and Affection variables, (e3 and e4 in the model) in the group of women, but this correlation turned out to be statistically insignificant in the group of men. The specific variance covariance of these variables (e3 and e4) allowed us to obtain satisfactory indicators of the model fit (taking into account the gender variable) to the data. All factor loadings (standardized regression weights – path coefficients in the model) assume satisfactory values (above .5) and are statistically significant in both groups (Figure 2).

The Chi-Square test results (χ2 = 4.30, df = 5, p = .507) as well as the individual match of fit indicators (SRMR = .019, RMSEA = .000, GFI = .994, AGFI = .981, CFI = 1) confirm the good fit of the hypothetical model to the data and the single-factor scale structure. The factor loadings of the individual observable variables range between .56 (adaptability) and .70 (partnership), which can be considered satisfactory, relevant to the scale. Attention should be paid to the results of women, which indicate the need for further research on the scale in this group. The CFA results in the studied group of women suggest that the Affection and Growth subscales may be related to each other. The broader sociodemographic profile should also be taken into account in further research.

3.4. Criteria relevance

The FAPGAR criteria relevance was assessed by determining the strength of the correlations between its results and the results of other tools that measure the functioning of the family. The results are summarised in Tables 6-8.

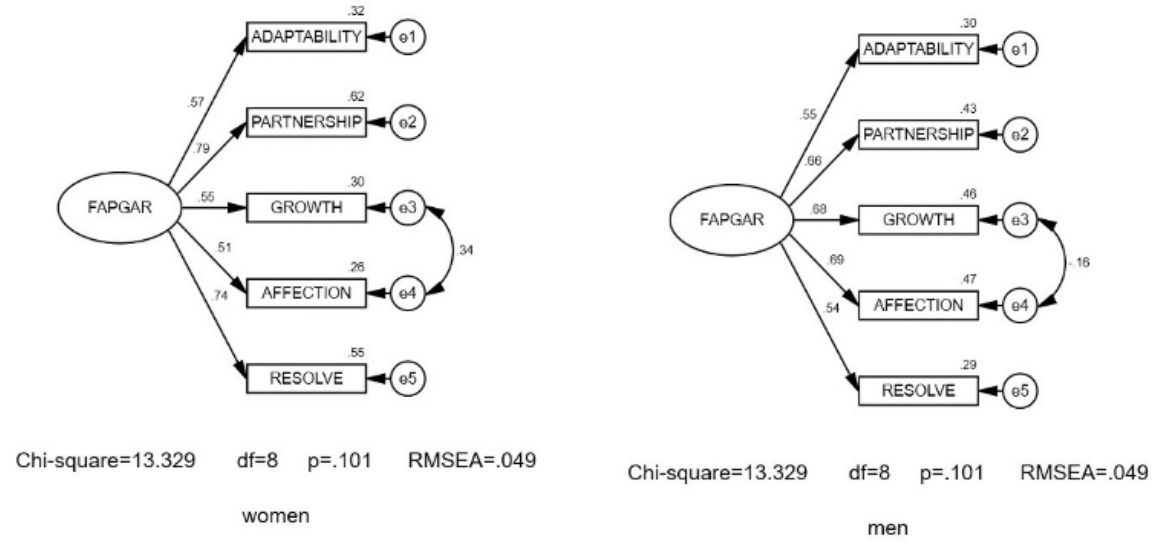

Figure 2. FAPGAR – Confirmatory Factor Analysis in women and men groups

According to the concept of Spanier (1976) and assuming a one-way construction of the tested FAPGAR, it was mainly expected that there would be significant correlations between the overall result of the DAS (measuring overall satisfaction) and the FAPGAR. The results confirmed that the most distinct (fair) relationships occurred in this area (Table 6).

Statistically significant links were observed between the FAPGAR score and the majority of the variables analysed for the functioning of the family, measured by SOR. The strongest compounds for the FAPGAR General Result are from Family Satisfaction, Family Communication, Balanced Cohesion (Table 7), and SOR General Result (Table 8).

It should be noted that although a significant part of the analyzed variables with individual FAPGAR scales indicate a weak correlation (below .3), the overall result of the FAPGAR scale (as the tool is intended for screening purposes) correlates with most other variables(general results) at the fair to moderate level – .3 to .6 (Han, 2003). It is worth adding that the relatively weak relationships between FAPGAR and tools based on system theory (SOR) in the research were explained by the curvilinear nature of the subscales (Takenaka & Ban, 2016). In other words, moderate levels of adaptability and coherence are optimal, but too much or too little are dysfunctional under normal circumstances. This is in line with the characteristics of the Circumplex model, in which avoiding extremes for any of the dimensions is of great importance for optimizing the functioning and well-being of an individual in the family system. Therefore, in the long term, the most effective for the functioning of the family is to regulate cohesion and flexibility so that it is at the average level of the intensity of these features (Olson & Gorall, 2003), which models specific (and therefore not necessarily high and having a specific sign / character) FAPGAR scales (an example here may be relationships with scores on the D, E, R and CH subscales) or their absence. This is indirectly confirmed by higher (fair to moderate) coefficients on communication scales (FC and FS), which additionally also seem to be more meaningfully related to FAPGAR (if we assume that communication in the Circumplex Model is understood as a facilitating dimension that helps the family to make changes in the level of cohesion and flexibility of family relationships, which seems to be most directly related to the perceived satisfaction with the relationship). This also applies to Balanced Cohesion, which mainly refers to the emotional ties between family members (Olson, 2011), which seems to be a dimension directly related to the sense of satisfaction.

Table 6. Correlation coefficients between Family APGAR and DAS.

	DC			DS			AE			DC			DAS GR		
Gender	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t
AD	.16*	.19*	.19**	.22**	.22**	.23***	-.01	.34**	.14*	.06	.2*	.13*	.18*	.29**	.23***
P	.27**	.27**	.28***	.44**	.07	.27***	.15*	.22**	.19**	.19*	.02	.12*	.37**	.19*	.30***
G	.35**	.34**	.35***	.44**	.20*	.34***	.41**	.26**	.35***	.28**	.26**	.28***	.46**	.36**	.42***
AFF	.31**	.32**	.32***	.32**	.33**	.33***	.30**	.34**	.32***	.15	.25**	.2***	.35*	.41**	.38***
R	.27**	.22**	.26***	.33**	.09	.23***	.166	.22**	.2***	.24**	.094	.18**	.34**	.2*	.29***
FAPGAR GR	.37**	.38**	.39***	.47**	.26**	.38***	.28*	.39**	.33***	.25**	.23**	.25***	.46**	.41**	.44***

* p ≤ .05; ** p ≤ .01; *** p ≤ .001. DC – Dyadic Concensus, DS – Dyadic Satisfaction, AE – Affectional Expression, DC – Dyadic Cohesion, DAS GR – DAS General Result, AD – Adaptability, P – Parthership, G – Growth, AFF – Affection, R – Resolve, FAPGAR GR – FAPGAR General Result; r_w – r coefficient for women, r_m – r coefficient for men, r_t – r coefficient for total group

Table 7. Correlation coefficients between Family APGAR and SOR.

	A			P			G			AFF			R			FAPGAR GR		
	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t
BC	.35**	.51**	.42***	.22**	.33**	.28***	.41**	.38**	.41***	.26**	.38**	.32***	.2*	.19*	.22***	.38**	.5**	.44***
BF	.22**	.25**	.24***	.2*	.2*	.21***	.39**	.2*	.31***	.28**	.22**	.25***	.12	.21**	.18**	.32**	.3**	.32***
D	-.25**	-.33**	-.28***	-.2*	-.09	-.14*	-.25**	-.22**	-.23***	-.25**	-.28**	-.26***	-.28**	-.03	-.15**	-.33**	-.26**	-.29***
E	.07	-.18*	-.03	-.15	-.08	-.10	-.27**	-.25**	-.24***	-.25**	-.21**	-.21***	-.1	-.02	-.04	-.19*	-.2*	-.17**
R	.04	-.05	.03	-.07	.02	.00	-.03	-.2*	-.08	-.05	-.22**	-.11	-.06	-.02	-.01	-.05	-.13	-.05
CH	-.1	-.28**	-.18**	-.29**	-.03	-.16**	-.27**	-.21**	-.24***	-.23**	-.21**	-.22***	-.22**	-.09	-.15**	-.3**	-.22**	-.26***
FC	.19*	.39**	.28***	.31**	.45**	.38***	.39**	.33**	.38***	.45**	.61**	.53***	.26**	.26**	.28***	.43**	.58**	.50***
FS	.17*	.46**	.30***	.32**	.45**	.39***	.36**	.38**	.38***	.34**	.59**	.45***	.32**	.31**	.34***	.41**	.62**	.51***

* p ≤ .05; ** p ≤ .01; *** p ≤ .001. BC – Balanced Cohesion, BF – Balanced Flexibility, D-Disengagement, E – Enmeshment, R – Rigidity, CH – Chaos, FC – Family Communication, FS – Family Satisfaction; r_w – r coefficient for women, r_m – r coefficient for men, r_t – r coefficient for total group

Table 8. Correlation coefficients between FAPGAR and SOR complex indicators.

	A			P			G			AFF			R			FAPGAR GR		
	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t	r_w	r_m	r_t
CF	.27**	.37**	.32***	.27**	.254*	.27***	.4**	.31**	.35***	.37**	.33**	.35***	.27**	.19*	.24***	.42**	.4**	.41***
FF	.17*	.25**	.21***	.27**	.18*	.24***	.37**	.28**	.33***	.31**	.26**	.29***	.2*	.24**	.23***	.35**	.34**	.35***
SOR GR	.26**	.37**	.32***	.3**	.25**	.28***	.42**	.334*	.38***	.38**	.35**	.36***	.27**	.22**	.26***	.43**	.42**	.43***

* p ≤ .05; ** p ≤ .01; *** p ≤ .001. CF – Cohesion Factor, FF – Flexibility Factor, SOR GR – SOR General Result; r_w – r coefficient for women, r_m – r coefficient for men, r_t – r coefficient for total group

4. Discussion

The main objective of the study was to analyse the psychometric properties of the appropriated FAPGAR on the Polish group. Additionally, there was a desire to clarify what aspects of the family's functions are measured by FAPGAR, examining its correlation with SOR scales (based on FACES IV) and DAS. Verification of the suitability of the FAPGAR family in general diagnostic practice was sought. The results indicate that the FAPGAR is a psychometrically sound instrument.

The statistical analysis showed a satisfactory validity and reliability of the version translated into Polish. The results indicate that the FAPGAR short scale, measuring family functionality, is suitable for use in clinical practice and research. For example, it can help the physician determine how to take advantage of the current strengths of the family and identify areas of development that may be beneficial in promoting the effective functioning of the family. Family assessment can be used for early identification of patients at risk of poor family functioning and screening tests to identify families experiencing problems, and it can also facilitate adherence to treatment recommendations by working with the family in specific areas of family functioning (Supphapitiphon et al., 2019).

The results are in line with several published surveys. In addition to the already classic studies by Smilkstein (1978; Smilkstein et al., 1982), confirming the usefulness of the tool, a number of other studies were also carried out confirming its advantages, such as the studies by Del Vecchio Good et al. (1979), Hilliard et al. (1986), Foulke et al. (1988), Gutiérrez-Mata et al. (2017), Ko et al. (2015); Lim et al. (2012), Nan et al. (2013), Okeafor and Chukwujekwu (2017), Odume et al. (2015), Powazki and Walsh (2020), Takeda et al. (2017), Takenaka and Ban (2016), Shapiro et al. (1987), Wang et al. (2016), confirm usefulness of this diagnostic tool. The FAPGAR scale appears to be an appropriate instrument for measuring family functionality, especially with reference to young people and young adults (DelVecchio Good et al., 1979).

In our research, the Cronbach's α coefficient was .78. A value of total-α indicates acceptable reliability. Over the years, studies around the world have obtained *C*ronbach's α values: Smilkstein et al. – .82 (1978), Silva et al. – .73 – .78 (2014), Benítez Molina and Caballero Badillo – .87 (2017), Castillo et al. – .78 (2014), Gómez-Clavelina et al. – .84 (2010), Ko et al. – .84 – .72 (2015), Özcan et al. – .79 (2011), Mayorga-Muñoz et al. – .99 (2019), Bellón Saameño et al. – .84 (1996), Kroplewski et al. – .88 (2019), Supphapitiphon et al. – .87 (2019), Lima-Rodríguez et al. – .93 (2015), Nan et al. – .91 (2014) confirm usefulness of this diagnostic tool. The results of the FAPGAR studies providing further support for construct validity. It seems, however, that research should be continued on larger groups of people (because, for example, group 156 – after being separated into sex, does not fully meet the CFA requirements).

The specific results obtained by women are somewhat puzzling. It is worth considering whether this is the result of their more careful approach to research and a more analytical view of their relationship compared to men. This thread is worth taking up in future studies, including the control of appropriate moderating variables.

Has the FAPGAR tool deserved such a harsh assessment as expressed by Yaphe (2013)? The results presented in the paper indicate an acceptable reliability and relevance in measuring the family functionality. Combined with the constructs of popular research tools (SOR, based on FACES IV and DAS), it shows the compounds certifying its diagnostic nature. All of this suggests that it is still a living tool, especially in diagnostic situations requiring rapid assessment of family functionality.

5. Limitations

Our research has some limitations. It is worth noting that the study was based on a relatively undifferentiated age group, namely adults, and therefore before passing the final judgment it might be worth including more diverse groups in the future studies – i.e. youth groups, young adults, etc.

We also did not verify the relationship of FAPGAR result, with for example an occurrence of family dysfunction or illness, and therefore we are unable to reliably answer the question of whether it is a tool that

can be used to evaluate the relationship between those variables. However, it seems that sufficient psychometric properties of Polish adaptation and confirmed accuracy of the method are optimistic that this kind of correlations can be measured in the future.

We are aware that the system tools used to analyze the accuracy (mainly the SOR) may not fully coincide with the FAPGAR compactness. In Poland, however, we do not have any other standardized, short family screening technique that could be combined with FAPGAR, therefore our choice was somewhat limited. We are also aware that this may have an impact on the results of the analysis of the relevance of the presented tool.

It also needs to be remembered that the tool belongs to the so-called short diagnostic tools and therefore has some limitations. However, although short timescales tend to have weaker psychometric properties than longer ones, often the possibility of using a shorter measure is a better option than completely dropping the measurement, especially if they have good psychometrics parameters (Tuszyńska-Bogucka, 2019). This does not change the fact that, as it stands, this instrument can be useful in assessing how families cope with the disease or the disability of their members, especially in clinical practice, considering the importance of the family as the primary guardian. It can also be used to carry out epidemiological research and management, planning and assistance, both of an individual and their family environment.

6. Conclusions

1. The FAPGAR is a less complex but enough reliable tool to measure the family functionality. Results show acceptable psychometric properties of the Polish scale adaptation of FAPGAR. It has both satisfactory reliability and relevance.
2. There is the potential of FAPGAR in family diagnostics. The fact that the scale has the acceptable characteristics – a acceptable validity and reliability indicated that family physicians can use FAPGAR in Poland to identify people's perceptions regarding their families functioning.
3. The reliability, measured by using Cronbach's α's, allows to conclude, given the acceptable values of the indices that were obtained, that there is an internal cohesion in each of the subscales of the total scale. Our data are in line with the scores obtained by other researchers, signalling the diagnostic value of FAPGAR.
4. It seems that it should be (in accordance with the original intention of the creators) dedicated to family doctors and other specialists who, by using the FAPGAR test, can conduct a preliminary assessment of the marital and family situation rather than aim for in-depth research
5. In conclusion of the pros and cons of the project, it can be said that more than 30 years after its creation, FAPGAR is still a popular and often used measure in studying intimate and close relationships. Measuring the quality of relationships is important because the correlations and the consequences of the quality of the relationship are so widespread. Although this field will certainly continue to create new measurement methods and perfect the current ones, FAPGAR remains a quite viable diagnostic force.

Data availability

All the data supporting the findings is contained within the manuscript, when there is in need the data-set used for the present study's conclusion can be accessible from the corresponding author on reasonable request.

Compliance with ethical standards

Ethical Approval The study was approved by the appropriate institutional research Ethics Committee and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments, or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Conflicts of interest

The authors have no competing interests to declare.

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