Original Article

Development of self report measure on pubertal changes for school going adolescent girls

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Objective: To investigate experiences of pubertal changes in adolescent girls in Pakistan and to measure experiences of these changes.

Methodology: This study was conducted in Government and Private schools of Lahore City from September, 2017 to March, 2019. Adolescent girls with an age range of 11-16 years were included in the study. A self-report measure was constructed in two phases. In phase I, steps of scale development including, identification of construct, item generation, logical review and empirical validation were defined. In phase II, psychometric properties and factorial structure of self-report measure were established.

Results:. Exploratory Factor Analysis (EFA) suggested three factors (emotional distress, behavioral maturation and self-care and management) while the association among the factors and aptness for factor analysis was depicted by Bartlett's test of sphericity. Out of 30 items, 26 items converge into factorial model. Reliability and concurrent validity of the scale was found to be adequate and discriminant validity of the scale was also high.

Conclusion: Pubertal Changes Experience Scale is a valid and reliable measure to evaluate experiences of menarche in adolescent girls. (Rawal Med J 202;45:158-162).

Keywords: Pubertal changes, menarche, physical changes, adolescent girls.

INTRODUCTION

A transition, from childhood to adolescence brings lots of changes in an individual.[1] The major transition from childhood to adolescence occurred when puberty starts. Pubertal changes include many indicators like appearance of secondary sex characteristics, breast development, age of menarche and changes in height and skin.[2] In girls, puberty is associated with the onset of menstruation. Along with the physical changes, adolescents experience psychological and social changes. Suddenly their role changes and they are expected to behave in a mature way.[3]

Girls in Pakistani culture are expected to behave in a certain manners after the physical maturity like their social activities are within the four walls of home. A study in Pakistan concluded that girls' behavior is culturally learned and mostly girls reported undesirable change in parental affection after reaching puberty.[4] Another study from Pakistan reported that there was significant negative attitude and experience related to menstruation existed in females of age 16-21.[5]

Existing instruments, which are used to measure pubertal changes are mostly related to physical development. These include Tanner's criteria of pubertal development,[6] Pubertal Development Scale[7] and Picture Based Interview about Puberty (PBIP).[8] These measure only physical development in puberty and ignore the other aspects such as social and behavioral and emotional changes at the time of puberty.

There is another scale which measure Attitude Towards Menstruation (AMS).[9] It was later adapted in Pakistan.[10] This scale is a good measure for the attitude towards menstruation, biological and sexual aspects of womanhood, but there is a limitation, for example it measures only one dimension of pubertal changes (menstruation). Therefore, current study was aimed to develop a scale which measures the experience of pubertal changes with reference to life style, family reaction, emotional changes and behavioral changes in adolescent girls.

METHODOLOGY

This cross sectional descriptive study was conducted with adolescent girls of Government and Private schools in Lahore city from September, 2017 to March 2019. The study was conducted into

two phases.

Phase I: Scale Development. Phase I was about exploring the phenomenology for the experience of pubertal changes. Four steps were followed i.e. construction and identification of construct, generation of items, logical review of the items and empirical validation. The identified construct was discussed with experts and with the help of existing literature and experts' opinion a semi structured interview was developed. For the first phase, 20 girls from grade 6-9 were selected. To get different expression of phenomenon, teachers and mothers (5 each) were also involved for semi structured interview.

Only those girls were interviewed whose menstruation had started. All participants (adolescent girls, mothers and teachers) were asked open ended questions in a semi structured interview. Following questions were asked i.e. How did you react towards body changes after puberty? What are the difficulties you had been through during pubertal changes? What are the familial expectations after puberty? What are the risk factors and protective factors which help girls to go through pubertal changes?

On the basis of semi-structured interviews, a list of items was finalized through a process as follow: A pool of verbatim of adolescent girls and teachers and mothers were collected. Only relevant and most reported verbatim were re-phrased according to proper sentence structure. Generated items in phenomenology were reviewed for their sentence structure, language of the items and simplicity of the content. A list of 32 items were retrieved after logical review by 3 clinical psychologists with minimum three years of experience in counseling and teaching. After this, a final scale consisted of 30 items; 2 items were excluded with consensus of experts.

Phase II: Psychometric Evaluation. Phase II was about establishing the psychometric properties of the pubertal changes experience scale.

Participants: A total of 194 adolescent girls from grade 7^{th}, 8^{th} and 9^{th} were selected by using stratified sampling technique. All girls were divided into three strata of classes and then sample was randomly selected. Girls of Grade 7-9 whose menstruation had been started were included in the study. Those girls whose menstruation was not started were excluded from the study.

Measures: To meet the scale construction protocol following measures were used:

Pubertal Changes Experience Scale (PCES). It is an indigenous scale which was developed in the first phase of the study. It is a 30 items scale with Likert scale of five points ranging from absolutely wrong to absolutely right.

Attitude towards Menstruation Scale (AMS). AMS [10] was used to assess attitude and experience about menstruation in girls. Adapted version of AMS by Aflaq and Jami was employed in this study. Range of item-total correlation (N= 175) was .16 - .68 at *p* .05 and .01 level. The internal consistency reliability of the scale was .86. This scale is consisted of 35 items. This scale was used to establish concurrent validity of newly developed scale.

Multidimensional Self- Concept scale. (mSCS)[11] This scale consisted of 132 items. For the current study, translated version of mSCS [12] was used. Only relevant subscales (Autonomy, Social competence, Goal Setting, Global, Religiosity, Close friendship and Affiliation) were used for convergent and divergent validity.

Procedure: Since asking about puberty to girls is sensitive topic. So researchers first build rapport through discussion about normal stages of growth and development. After maintaining comfort between participants, researcher explained purpose of research to them. A written Informed consent was taken from the school administration and all participants. Research protocol was administered to school girls in group setting. The participants were instructed verbally and assisted during the process of filling the questionnaires. The participants took 35 to 45 minutes to fill the questionnaires.

RESULTS

Item analysis was carried out through item total correlation. Each item was strongly correlated ($p<.01$ and $p < .05$) with the total score of the scale that showed the high internal consistency of the scale. Principal axis factoring with Oblimin rotation was used to determine factor structure of

PCES (Table 1). To establish the reliability of PCES alpha coefficient was computed (Table 2).

Table 1. Factor Loadings, Eigen values, Cumulative percentages, and variance of Items of PCES on three factors (N= 194).

Item No	F1 Emotional Distress	F2 Behavioral Maturation	F3 Self care and Management
PCS17	.709	.121	-.028
PCS16	.600	.206	-.140
PCS10	.541	.095	-.144
PCS15	.526	-.057	.046
PCS27	.523	.089	-.064
PCS3	.471	-.098	.150
PCS18	.459	-.090	-.117
PCS2	.426	-.134	.026
PCS14	.364	-.194	.078
PCS12	.342	-.046	.088
PCS21	.232	-.113	.079
PCS30	.210	.165	.053
PCS6	.096	.640	.213
PCS7	.044	.552	.146
PCS19	-.011	.530	.187
PCS9	.016	.476	.007
PCS11	-.004	.451	.029
PCS5	.267	.420	.133
PCS28	-.117	.376	.319
PCS1	-.124	.347	.114
PCS22	-.013	.325	.235
PCS13	.176	.324	.033
PCS4	.155	.318	.248
PCS29	.094	.283	.007
PCS24	.151	.032	.551
PCS23	.169	-.023	.502
PCS8	.240	-.165	.489
PCS20	-.122	.093	.412
PCS25	.185	.124	.417
PCS26	-.090	.217	.227
EigeneValue			
Variance	16.847	7.36	4.77
Cumulative percentages	16.84	24.2	28.98

Table 2. Alpha Coefficient of Pubertal changes Experience Scale and Test Re-test Reliability

Scale	Items	(a)
PCES	*30*	*.82*
PCES	*30*	*.80*

Table 3. Correlation between Pubertal Changes Experience Scale and Attitude towards Menstruation scale.

Scales	Items	Pubertal Changes Experience Scale	Attitude towards Menstruation Scale
Pubertal Changes Experience Scale	30	-	.16
Attitude towards Menstruation Scale	30	.16	-

*p< 0.05

Table 4. Convergent and Divergent Validity between six factors of multidimensional Self-Concept scale (mSCS) and Pubertal Changes Experience Scale (PCES)..

Scales	1	2	3	4	5	6	7
1 Autonomy		.483**	.410**	.253**	.342**	.313**	**.155***
2 Global			.486**	.379**	.432**	.259**	.082
3 GS				.379**	.491**	.423**	**.209****
4 MR					.662**	.427**	**.294****
5 SC						.550**	**.278****
6 CA							**.231****
7 PCES Total							

** Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level. GS= goal setting, MR= morality and religiosity, SC= social competence, CA= close and affiliation

Adapted Attitude towards Menstruation Scale was used to establish concurrent validity of the newly developed scale PCES (Table 3). Urdu version of Multidimensional Self- Concept Scale along with Pubertal Changes Experience Scale was used to establish divergent validity of the scale (Table 4).

DISCUSSION

The acceleration of pubertal development is an important medical and social problem, as it may result in increased morbidity and distress in later life.[13] The pubertal changes occurr during early adolescence and continue till the adult physical development. Pubertal changes are the ongoing process which leads to psycho social and emotional adjustment.

Factor analysis was carried out on PCES to establish its factor structure. Oblimin rotation was carried out in factor analysis of PCES because it is considered to predict precision and clear interpretation of scale factors.[14] Factorial structure of the scale clearly

defines three dimensions of pubertal changes. These factors categorically explain that pubertal changes bring emotional turmoil, maturity and independence related to self- care and management. First factor, 'Emotional distress' during pubertal changes is a reason of hormonal interplay[15] and also due to social response towards menarche. As it is stated that though menstruation is a natural phenomenon occurred in all healthy women but still it is a topic cloaked with taboo and secrecy and negativity in society, which is associated with emotional disturbance in girls.[16]

The positive factors of scale including Behavioral maturation and selfcare while experiencing pubertal changes confirmed the fact that physical maturity allows adolescence to experience autonomy and other positive aspects of socialization.[17] The resultant positive factors of the scale indicated that several physical, cognitive and relational changes occurred during adolescence lead to socialization. The findings of the study confirmed with existing literature that suggested pubertal timing is very important to develop emotional reactivity and self-regulation, which lead to pro-social behavior in adolescents.[18]

The psychometric properties of this scale suggested that it is a reliable and valid tool to assess experiences of pubertal changes in girls. School girls were selected for this study, because varied age range can be tapped in this group for measuring experiences of pubertal changes. AMS was used for concurrent validity. The value of concurrent validity (r =.16, p = .05) suggested positive correlation between two scales. The low value may be due to diversity of PCES. As AMS measured attitude towards menstruation whereas, PCES has different domains as mentioned above. Indigenous scale will provide a wider and diverse assessment at the time of puberty in adolescent girls.

In this study, only relevant subscales of multidimensional self-concept scale were used to establish convergent validity. Convergent validity suggested that PCES discriminates with construct of well-established scales. Results suggested internal consistency among sub scales of self-report measure. All analysis suggested that PCES is a valid assessment tool for measuring experiences of pubertal changes in school girls.

This study may be helpful in providing base line information about pubertal changes experiences of adolescent girls in Pakistan. This will provide a gateway to describe emotional and behavioral changes occur during pubertal changes, which are needed to discuss with adolescents in reference of their upcoming adult life. Awareness about pubertal changes is important to spread a word by gynecologist and general medical practitioners about hygienic conditions and female reproductive health.

CONCLUSION

Pubertal Changes Experience Scale is a valid and reliable measure to evaluate experiences of menarche in adolescent girls. Gender differences regarding experience of puberty in boys should be investigated in future.

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