

## Impact of provided Intervention through Developed mobile application on Awareness of Early adolescent boys regarding selected Developmental changes during Early adolescent stage

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### ABSTRACT:

Adolescence is the word derived from Latin word *Adolescere* meaning to grow up to maturity. It is a transitional stage of physical and psychological development that usually occurs during the period starting from puberty to legal adulthood i.e. age of maturity. Adolescence is associated with 10 yrs. to 19 yrs. of age (World Health Organization, 2017); In comparison to girls, boys begin their growth spurt about two years later, usually between the ages of 10 years to 16 years and reach their adult height between the ages of 13 years to 17 years. During these years, males grow muscle much faster than female, an adolescent's heart and lungs increase in both size and capacity. The growth spurt is very high, shoulders will broaden and his body muscles will develop. Hormones will produce more oil on his skin and may result in acne breakouts. Testicles will begin to grow, penis begins by growing in length, followed by width. To be aware about these developmental changes, intervention is must, specially to early adolescent boys as girls are getting it's knowledge from family and community whereas boys are deprived from this awareness. Awareness is knowledge about the state of some environment. It is a term used to denote knowledge created through the interaction of an agent and its environment, in simple terms knowing, what is going is awareness. Now a days more advanced mobile phone technologies are enabling the potential for education and early adolescent boys are more engaged in browsing mobile devices. Researchers found that the usages of mobile apps. strongly correlates with user context and depends on user's location and time of the day. Mobile phone apps. are playing an ever-increasing role within healthcare and when designed and integrated correctly can yield many benefits. So after developing need based mobile app. on selected developmental changes during early adolescent stage, intervention was provided through developed need based mobile app. for a month to the respondents of experimental group, it can be concluded that the provided intervention through developed mobile phoneapp.,regarding selected developmental changes has significantly positive impact on awareness levels of early adolescent boys of experimental group,where as very slight and negligible change were found in control group respondents, which indicates the emergency of intervention to early adolescent boys.

**Keywords:** Early adolescent boys,selected developmental changes,Impact, Intervention, Mobile application, Awareness

### INTRODUCTION

Adolescence is the word derived from Latin word *Adolescere* meaning to grow up to maturity.It is a transitional stage of physical and psychological development that usually occurs during the period starting from puberty to legal adulthood i.e. age of maturity. Adolescence is associated with 10 yrs. to 19 yrs. of ages of human life. (World Health Organization, 2017); but it's physical and psychological and cultural expressions may starts very early and end later. As approximately 1.2 billion adolescents make up for 18% of the world's population where majority of total adolescents reside within Asia itself (United nations children's emergency funds, 2002). In case of India, India is called as a young country whose 19.6% of the total population is between the age of 10 years to 15 years, and has the largest adolescent population in the world. (Sources: progress for children: A progress card on adolescents. UNICEF). Approximately one in every six Indians is an adolescent.

Early adolescence is a period which start from 12 yrs upto 14 yrs., when children should have a safe and clear space to come to terms with this physical, cognitive, emotional, social, sexual and psychological transformation unencumbered by engagements in adult roles and with the full support of nurturing adults at home, at school and in the community. Given the social taboos often surrounding puberty, it is particularly important to give early adolescents all the information about developmental changes, they need to protect themselves due to its awareness. Today's early

adolescents are tomorrow's leaders. The base of a perfect adult is growing up gracefully with the right values, self-control, willpower, positive attitude, hard work, ownership qualities etc. Of course, all are not born to be the leaders but such important factors form strong base of their life, defiantly they would have relatively quality life rather than struggling thought-out the life. They need love, affection, care, understanding and guidance and most importantly guidance and counselling.

In comparison to girls, boys begin their growth spurt about two years later, usually between the ages of 10 years to 16 years and reach their adult height between the ages of 13 years to 17 years. During these years, males grow muscle much faster than female, an adolescent's heart and lungs increase in both size and capacity. The body begins to grow, shoulders will broaden and his muscles will develop. Hormones will produce more oil on his skin and may result in acne breakouts. Testicles will begin to grow, penis begins by growing in length, followed by width.

Awareness is knowledge about the state of some environment. It is a term used to denote knowledge created through the interaction of an agent and its environment, in simple terms Awareness is knowing, what is going. Awareness is meant to convey how individuals monitor and perceive the information surrounding their colleagues and the environment they are in.

Now a days, Mobile phone penetration rate has increased drastically over the last decade. Mobile phones usage is increasing as the cost of mobile technology development has reduced substantially and people find it more affordable irrespective of whether they fall in low and middle-income families. Smartphone technologies are now in the hands of a large number of students even from low- and middle-income families. More advanced mobile phone technologies are enabling the potential for education. Which is referred as mEducation.

The motivation behind the development in the mEducation field arises mainly from two factors. These are the myriad constraints felt by educational system of developing nations. These constraints include high population growth, a rate of ignorance and literacy inhabitants, limited financial resources to support educational infrastructure and educational information system and the recent rapid rise in mobile phone penetration in developing countries. With greater access to mobile phones from all segments of the country including rural areas, the potential of lowering information to deliver education improves. A mobile application (mobile app) is a computer program or software application designed to run on a mobile device such as a phone, tablet or watch. Mobile apps are generally downloaded from application distribution platforms which are operated by the owner of the mobile operating system such as the App Store (IOS) or Google Play Store. With a growing number of mobile applications available in app stores and the improved capabilities of smart phones, people are downloading more applications to their devices. Usages of mobile apps has become increasingly prevalent across mobile phone users. Researchers found that usage of mobile apps strongly correlates with user context and depends on user's location and time of the day. Mobile apps are playing an ever-increasing role within healthcare and when designed and integrated correctly can yield many benefits.

## MATERIAL AND METHODS

To conduct present research study, Experimental research design was followed to find out the impacts of intervention imparted by developed need based mobile phone application only to experimental group respondents, to enhance awareness of early adolescent boys regarding selected developmental changes. Experimental Research Design is a research method used to investigate the interaction between independent and dependent variables, which can be used to determine a cause and effect relationship. Experimental research is generally used within the framework of the scientific method in which two groups such as experimental and control were selected for comparison and for assessing impact of provided intervention to experimental sample.

The present study was conducted in the four Government secondary schools located within the municipal limits of Beed city of Maharashtra to ensure optimum personal contacts for data collection.

**SAMPLE AND IT'S SELECTION:-**For sample selection, the investigator first obtained a list of government schools from District Education Office, Beed, Maharashtra.

The researcher selected four schools within the municipal limits of Beed city, having the similar infrastructural facilities keeping the delimitations of the study in mind i.e. only early adolescent boys of age range between 12-14 years, those studying in Govt. Secondary schools of Beed city of Maharashtra and who can access android /smart mobile phone.

These schools were ready to cooperate with the investigator and were interested in contributing towards the research study. To obtain a sample of 200 early adolescent boys, a preliminary survey was conducted and 320 proformas were distributed (80 proformas in each school) among the desired age groups in the four selected schools. From the preliminary survey, an eligible sample of 260 subjects were obtained (60-65 eligible subjects from each of the schools) and the final sample of 200 adolescents boys (50 eligible subjects from each selected school) were drawn purposively as per the delimitations of the study. Remaining subjects were discarded as they were not fulfilling the criteria for sample selection. From the entire process, the final sample comprised of 200 early adolescents boys i.e. 100 early adolescent boys from two government schools for experimental group and 100 early adolescent boys from two government schools for control group between 12-14 years of age were selected.

#### **TOOLS AND THEIR DESCRIPTION**

Selection and development of tools to achieve the objectives of a research study is an important step in every research. Keeping in mind the purpose of the present study and its inherent research variables, the investigator used the following research tools for data collection: **Preliminary Information Proforma, Background Information Proforma, Scale for measuring awareness of early adolescent boys.**

**a) Preliminary proforma :** A preliminary proforma was prepared to get necessary details regarding subjects. The proforma was comprised of general information like name, age, address, occupation/profession of parents, etc. and accessibility for android / smart mobile phone

**b) Background information proforma :** The proforma was developed by the investigator to get the general information about the personal and familial details of selected samples which have direct or indirect bearings on major research variables of the study such as name, age, address, family size and types, educational qualifications of the parents, monthly income etc.

**c) Scale for Assessment of Awareness regarding selected developmental changes :** In order to measure the awareness of early adolescent boys regarding selected developmental changes, a scale was constructed, developed and standardized by calculating its validity and reliability by the investigator. The different steps were followed for developing the scale as follows.

**Step I: Generating Statements:** First of all, the investigator referred different literature sources such as books, Journals and Standardized Scales and decided upon the various aspects under which awareness regarding selected developmental changes of early adolescents boys were assessed. Then, the final aspects of developmental changes i.e. Physical and Psychosocial- emotional, social, sexual, moral were selected. For assessing awareness regarding each aspect, statements of specific aspect related to the age were formulated. Three options (Yes, No, Not Sure) were given to each response to find the level of awareness among the early adolescent boys.

**Step II: Scoring Pattern of “Scale for assessing Awareness of early adolescent boys regarding selected developmental changes”**

For measuring awareness of early adolescent boys regarding selected developmental changes, scale has been developed which consists of three response options indicating high, moderate and low levels of awareness. A score of ‘3’ was sought for ‘High’, ‘2’ for ‘Moderate’ and ‘1’ for ‘Low’ level of awareness. The maximum and minimum scores were obtained by multiplying the total number of statements with “3” and “1” respectively.

**(Response in Scores: 3=High, 2=Moderate, 1=Low)**

#### **C) Standardization of developed Research scales**

The standardization process is presented under the following heads: **Validity of scale and Reliability of scale**

**Validation of Research Tool:-** The act of officially or legally certifying or approving something is called as Validity. Content Validity pertains to the degree to which the instrument fully assesses or measures the construct of interest. The developed research tool i.e. Scale on awareness regarding

developmental changes were assessed by the panelists consisting of experts from Human Development and Family Studies, Doctor, Psychologist and Sociologist for content validity. A pilot study on one third of selected respondents was carried out to validate the tool .

Very valuable and useful feedback were received and incorporated in the content of the scales. The validation of scales was based on five point rating scale, which comprise 1 score for not at all suitable ,2 for Not Suitable ,3 for Suitable, 4 for Somewhat suitable and 5 score was for Highly suitable .

The calculated mean scores obtained 5 indicated that the scale was ‘Highly Suitable’,4 means ‘Somewhat Suitable’,3 means ‘Suitable’ ,2 means ‘Less Suitable’ and 1 means ‘Not at all Suitable’ to assess the aspects namely awareness and coping strategies .

**Reliability of Scales :**Reliability is the degree to which research method produces stable and consistent results . A specific measure is considered to be reliable if it’s application on the same object of measurement number of times produces the same results.To establish reliability of the research scale, a pilot testing was done and the scale was administered on a sample of 40 early adolescent boys , which were not included in the final sample. The data collected was coded and reliability of Awareness scale was calculated by using split half technique. In split half technique, the test was divided into two equal halves and correlation of the whole scale was estimated by calculating the co-efficient of correlation between the variables.

**The reliability coefficient of the developed tool obtained is given in Table-3.5**

**Table-3.5: Reliability Coefficients of the Scale**

Scale	Awareness Scale
Reliability Coefficient	0.86

## DESIGNING ,DEVELOPMENT AND VALIDATION OF MOBILE PHONEAPPLICATION

Mobile phone application on selected developmental changes in boys during early adolescence stage was developed based on the pre assessment results of awareness of respondents about the selected developmental changes during this period. The investigator did in-depth study of books, journals and research publications to gather information regarding developmental changes for developing and designing of the need based mobile app. The investigator provided all the information in a systematic , scientific and very simple way to a registered and certified mobile phone application developer to develop a mobile application in Hindi as well as in Marathi languages for imparting intervention for a month to only experimental group respondents. The content of mobile app. consist of sections such as -Early adolescence period , Physical changes , Psycho-social changes . Emotional changes ,Social changes, Sexual Changes ,changes in morality Family Relationship ,vi Coping strategies to be adopted .

**Validation of developed Mobile Phone Application on “Awareness of early adolescent boys regarding developmental Changes during early adolescence stage :** The developed Mobile Phone Application was provided to the subject matter experts for language, content analysis and methodology adopted. The subject matter experts were from the faculties of Human Development and Family Studies, Psychology and Sociology. Field testing of developed mobile application was done on one third of selected respondents for validation of developed mobile phone app..Very valuable and useful feedback were received and incorporated in the content of the mobile app.. The validation of the mobile app .was based on five point rating scale. The details of the rating are score1for poor,2 for average,3 for good,4 for very good and 5 for excellent .Score obtained for developed mobile app.was 5,which indicates that it is excellent for providing intervention.

## EXECUTION OF INTERVENTION :-

Intervention was executed only to the respondents of experimental group through need based developed Mobile phone Application on awareness regarding selected developmental changes . Before providing intervention developed mobile phone app. to early adolescent boys of experimental group, investigator personally provided training to the respondents on how to download ,browse /use the developed mobile app. The' respondents were allowed to use it for a month as per their convenience though they were instructed to go through all the information sequentially given chapter wise. It was a highly interactive study which was profoundly engaged the user on daily basis and was keep them in constant contact with research scholar through emails, what's app and mobile phone calls for any queries. Therefore, this mobile app. based regime was not only facilitated the user but also effectively analyzed the impact of the developed need based mobile application on awareness of experimental groups' respondents.

### PROCEDURE FOR DATA COLLECTION

After the selection of the appropriate sample of 200 respondents (i.e.100 early adolescent boys for experimental groups and 100 early adolescent boys for control group from four government schools) through the preliminary survey, the scale to assess awareness regarding selected developments was developed by the investigator and administered on the respondents of both the groups . The investigator personally collected the data from the selected respondents of experimental and control groups from four selected government schools after the purpose of the study was made clear to the respondents. They were requested to give their responses and were assured that their identity would be kept confidential and information provided by them would be used exclusively for the purpose of research work. When the respondents were satisfied with the assurance given to them, the scales was administered on them to procure data regarding the research study from the experimental and control groups.Data collection on awareness regarding selected developmental changes during early adolescent period was done by administrating developed scale on "Awareness regarding selected developmental changes during early adolescent period ". The respondents took around 35-45 minutes to fill the complete information .Pre assessment was conducted on the experimental and control groups' respondents. After administering the scales on the entire sample, the responses were coded for all the subjects and the results were obtained .

### Coding, categorization and analysis of Coping strategies Scale

To accomplish the first objective of the study, the data was coded on the basis of response options provided for each item of the scale on awareness of early adolescent boys and the 'Frequencies' and 'Percentages' were calculated for all the selected aspects. On the basis of scores obtained, the early adolescents boys were categorized into four main categories i.e. On the basis of scores obtained, the early adolescent boys were categorized into three main categories i.e. respondents having High, Moderate and Low levels of awareness regarding selected developmental changes taking place during early adolescence years .

**ANALYSIS OF DATA:-** For analysis of data, collected information was coded, categorized and put under statistical measures as mentioned above and statistical results were described in a very systematic and scientific way table wise in result and discussion chapter.

### RESULT AND DISCUSSION

The information regarding the selected background variables and distribution of respondents of experimental and control groups for each variable is given in Table No1.

**Table 1 Background Information of early adolescent boys of experimental and control groups n-200**

Background variables	Percentages of the respondents	
	Control Group (100)	Experimental Group(100)
Age group		
12-14 yrs.	100 (100)	100 (100)
Sizes of families		
Small (1-4)	70 (70)	69 (69)
Medium (5-8)	21(21)	23 (23)
Large (>9)	9 (9)	8 (8)

<b>Ordinal Position</b>		
First	44 (44)	49 (49)
Second	54 (54)	50 (50)
Third	2 (2)	1 (1)
<b>No. of Siblings</b>		
1	89 (89)	86 (86)
2	10 (10)	10 (10)
3	01 (01)	04 (04)
<b>Types of Family</b>		
Joint	26 (26)	21 (21)
Nuclear	74 (74)	79 (79)
<b>Fathers Education</b>		
College + Under graduate	--	--
Middle School + High School	04 (04)	06 (06)
Primary School	25 (25)	35 (35)
Illiterate	71(71)	69(69)
<b>Fathers Occupation</b>		
Small business/Shop/ Agriculture	37 (33)	33(33)
Skilled worker	09 (13)	13 (13)
Unskilled worker	64 (64)	54 (54)
<b>Mothers Education</b>		
College + Under graduate	--	--
Middle School + High School	02 (02)	07 (07)
Primary School	62 (62)	68 (68)
Illiterate	36 (36)	25 (25)
<b>Mothers Occupation</b>		
Small business/Shop/ Agriculture	02 (02)	12 (12)
Skilled worker	02(02)	10 (10)
Unskilled worker	96 (96)	78 (78)
<b>Monthly Income</b>		
Low (Between Rs. 2500-5000)	69 (69)	77 (77)
Medium (Between Rs. 5001-7000)	31 (31)	33 (33)
High (Between Rs. 7001-Above)	--	--

Figure in the parentheses indicates the frequencies

**1. Age Group of the respondents:** All the respondents i.e. (early adolescent boys ) of experimental group (100) and control group (100) were in the age range of 12 yrs.to 14 yrs. as this age group comes under early adolescence stage of life .

**2. Size of Families:** Size of the families was decided on the basis of number of family members, and it was divided into three sub-categories . They are- Families having 1-4 members was small families , five to eight members was medium size and more than 9 members in the families was called as large families. The data for early adolescents boys of control group revealed that 70 per cent of the early adolescent boys were under small family size category , 21 per cent boys were under medium size family and remaining i.e. only 9 per cent early adolescent boys come under large family size.

On evaluating the data for experimental group early adolescents boys ,similar trend was found in both the groups respondents i.e.majority of the boys (69.3% ) were having small size family . 13 per cent were living in medium size family and only 8 per cent early adolescent boys were in the category of large size family

**3.Ordinal Position of the respondents:** In this section ,ordinal position of the respondents of control and experimental groups were discussed ,this category was further divided into three sub categories i.e. First Born, Second Born and Third Born . Among early adolescents boys of control group , 44 per cent of the boys were first born, 54 per cent boys were second born and 2 per cent boys were third

born. Among early adolescents boys of experimental group , 49 per cent of the boys were first born, 50 per cent boys were second born and only one per cent was third born .

**4. Number of Siblings:** This category was further divided into three sub-categories i.e. respondents having One, Two and three siblings. The data for early adolescents respondents of control group indicates that, 89 per cent of the boys were having one sibling, 10 per cent boys were having two siblings and only one per cent respondent was having three siblings . For the early adolescents boys of experimental group , majority of the boys (86 %) were having one sibling. 10 per cent boys were having two siblings and 4 per cent boys were having more than two i.e. three siblings.

**5.Type of Families:** This category was further divided into two sub-categories i.e. belonging to Joint family or Nuclear family . 26 per cent early adolescent boys of control group were belonging from joint family type where as majority i.e. 74 per cent of the respondents were from nuclear families. Similar trend was found in case of experimental group respondents i.e. 21 per cent respondents were belonging to joint families whereas, on the other hand majority (79 %) of them were belonging to nuclear family type

**6. Educational Qualifications of Parents:** The table no. 4.1, further throws light on the data related to educational qualifications of the parents. The four sub-categories are -College +Under graduate , Middle School + High school ,Primary School and Illiterate. For, the fathers of early adolescent boys of control group , majority (71%) were Illiterate (25%), were completed primary schooling , while rest (4%) were under Middle School + High school . Among the fathers of early adolescent boys of experimental group , majority were Illiterate (69%), 35 per cent were completed primary schooling , while remaining (6 %) were Middle School + High school .Among the mothers of early adolescent boys of control group , majority i.e.62 per cent were completed primary schooling . 36 per cent mothers were Illiterate , while very less i.e. 2 per cent were completed their middle school + high school .

**7. Occupation of the Parents:** This category was further divided into three sub-categories for the fathers i.e. fathers engaged in Small business/Shop/ Agriculture , Skilled worker and Unskilled worker . Data related to father's occupation of early adolescent boys of control group revealed that majority ( 64 %) were involved in unskilled work ,37 per cent were involved in Small business/Shop/ Agriculture while only 9 per cent father were skilled workers . For the fathers of early adolescent boys of experimental group 54 per cent were unskilled workers and remaining i.e.(13 %) were skilled workers . For the mothers, this category was further divided into three sub-categories i.e.Small business/Shop/ Agriculture, Skilled worker and Unskilled worker. Data for mothers of early adolescents boys of control group , indicates that majority (96 %) of the mothers were unskilled workers while 2 per cent each were involved in Small business/Shop/ Agriculture and skilled workers respectively ,on the other hand similar trend were found in mothers of experimental group respondents 78 per cent were unskilled workers ,while 12 per cent mothers were involved in Small business/Shop/ Agriculture ,rest ( 10 %) were skilled workers.

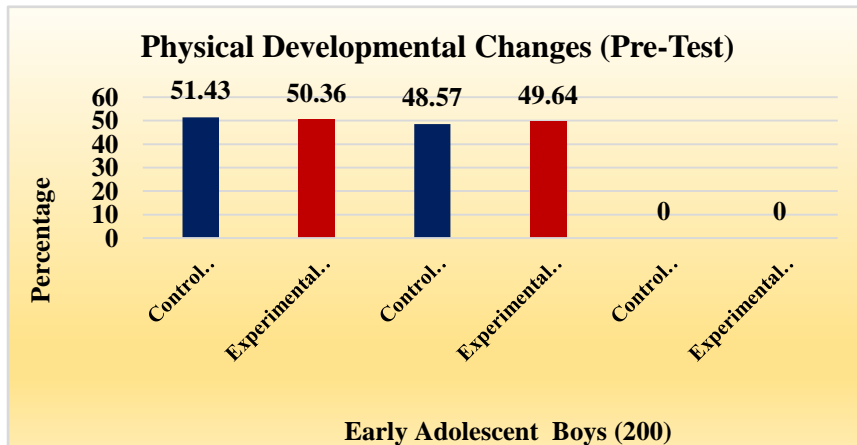
**8.Monthly Income :** This category was further divided into three sub-categories i.e monthly income between Rs.2500-5001 as low income group ,between Rs. 5001-7000 as medium income group and between Rs. 7001-Above as high income group families ,Majority (69% ) of the families of control group respondents were between Rs., 2500-5000/- while 31 per cent families were between Rs. 5001 - 7000 /-monthly income range . 77 per cent families of experimental group respondents were between Rs.2500-5000 ,remaining i.e. 33 per cent were having Rs.5001-7000 monthly income

**Assessment of awareness of early adolescent boys of experimental and control groups before and after imparting intervention through developed need based mobile app., regarding selected developmental changes during early adolescent stage**

**Awareness levels regarding Physical Developmental Changes :**

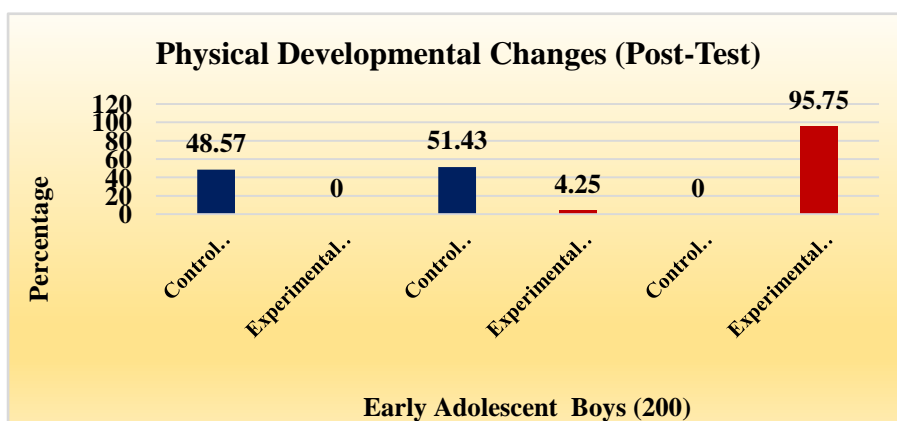
The data related to physical development during early adolescent stage of respondents of control group reveals that 51.43 per cent were having low level of awareness followed by

48.57 percent respondents were under moderate level of awareness regarding physical developmental changes ,this trend is similar as revealed by research study conducted by Banstola, R. (2015) on Physical and Psychosocial Problem in Children engaged in Child Labour . Similar trend was found in experimental group respondents prior to initiation of intervention through developed mobile app.

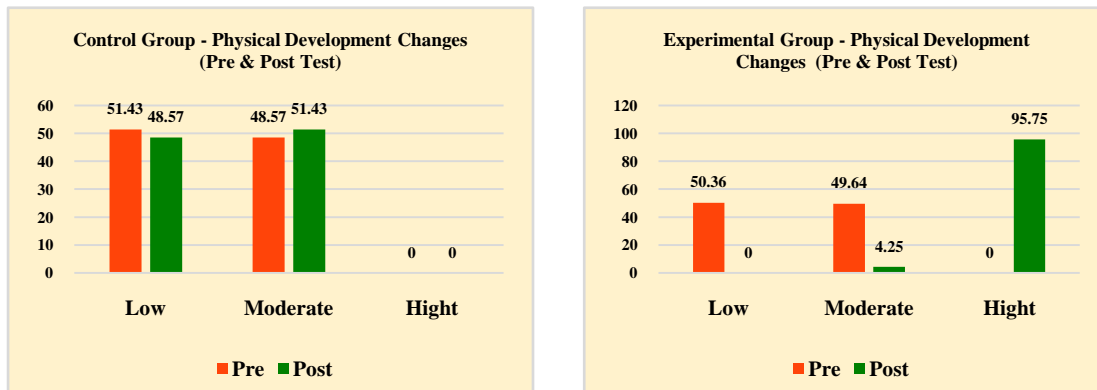


**Fig. 1 : Percentage distribution for the levels of awareness regarding physical developmental changes of early adolescent stage before imparting intervention**

Fig2.shows that after imparting intervention only to experimental group respondents ,95.75 per cent of the respondents of experimental group were come under high level of awareness regarding physical developmental changes ,whereas remaining respondents were under moderate level of awareness .No change were found in control group respondents who were not provided intervention.



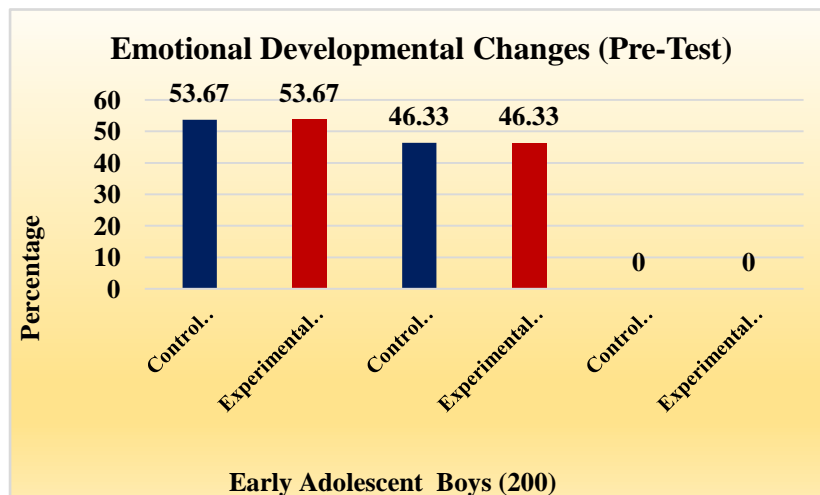




**Fig. 2 (Fig.2A &2B) Percentage distribution for the levels of awareness regarding physical developmental changes of early adolescent stage after imparting intervention through developed mobile app.**

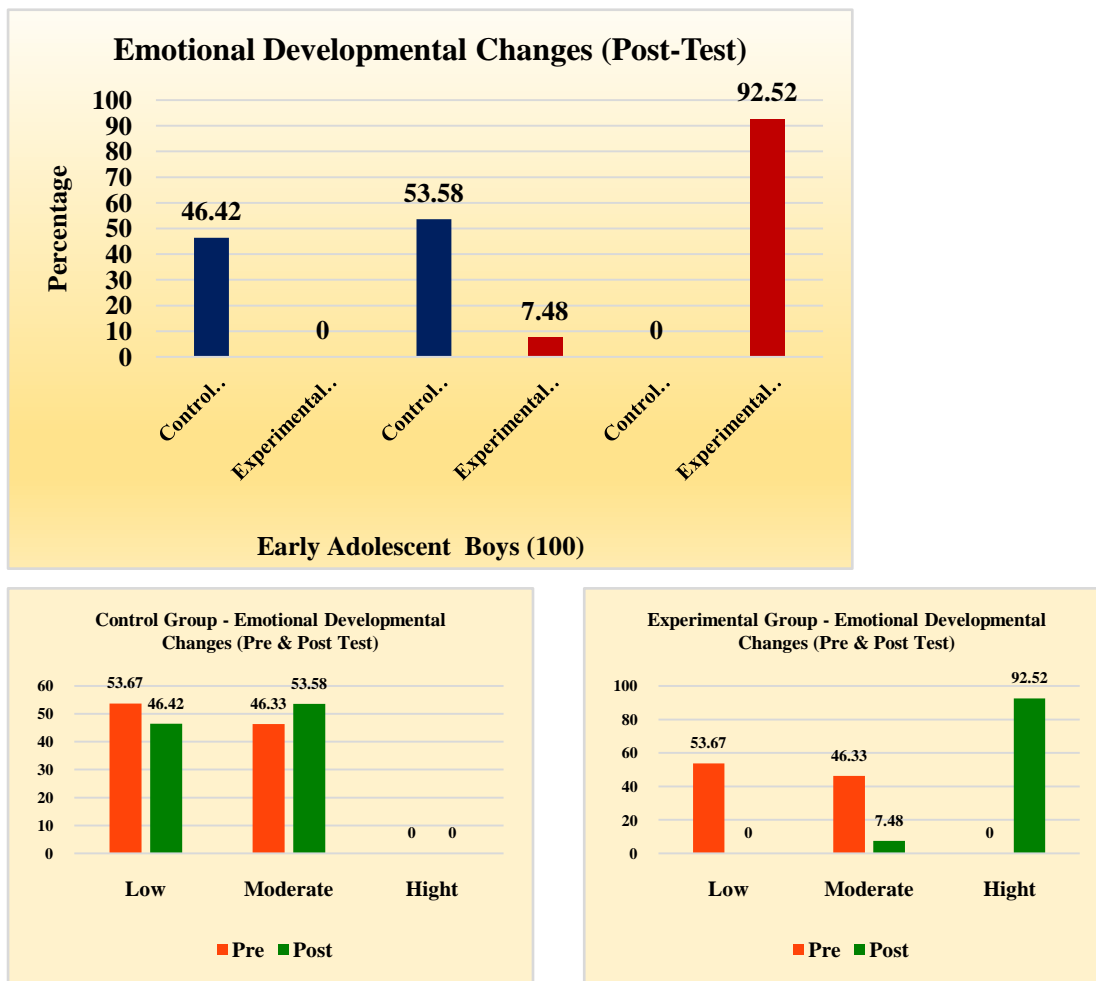
### Awareness levels regarding Emotional Developmental Changes

Under psychosocial development , emotional development is also an important developmental changes taking place during early adolescent stage ,which may have it's great impact on individuals personality development . In this category ,53.67 per cent respondents of both the group'srespondents were having low levels of awareness regarding emotional developmental changes taking place during early adolescent stage followed by 46.33 per cent were under moderate level of awareness .



**Fig. 3 : Percentage distribution for the levels of awareness regarding emotional developmental changes of early adolescent stage before imparting intervention**

Fig.4 revealed that after imparting intervention for a month to only experimental group respondents ,the drastic increase (92.52%) in awareness level of experimental group respondents were found followed by 7.48 per cent were under moderate level of awareness .After post assessment ,no change were found in control group respondents as no intervention were provided to them. It clear indicates that developed need based mobile app., had positive impact on experimental group respondents .



**Fig. 4 (Fig.4A & 4B) Percentage distribution for the levels of awareness regarding emotional developmental changes of early adolescent stage after imparting intervention**

**CONCLUSION**

It can be concluded that the provided intervention through developed need based mobile phone application ,regarding selected developmental changes has significantly positive impact on enhancing awareness levels of early adolescent boys of experimental group, which indicates the emergency of intervention to early adolescent boys.

**RECOMMENDATIONS:**

The developed need based mobile phone app.,in dual language (Marathi and Hindi) is recommended for the use by the department of Women and Child welfare for providing intervention to early adolescent boys .Also it can be used by educators ,scientists ,psychologists, Human developmentalist ,government and non government agencies for providing intervention to early adolescent boys .

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