International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 9, September 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.9.2024.102

ORIGINAL RESEARCH

Awareness and attitude about endocrine disruptors among teenage girls

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Received Date: 15 July, 2024 Accepted Date: 20 September, 2024

ABSTRACT

Background: Puberty represents a critical phase of developmental changes that signifies the shift from sexual immaturity to reproductive maturity. Endocrine-disrupting chemicals (EDCs) pose potential health risks through a variety of mechanisms. Hence; the present study was conducted for assessing awareness and attitude about endocrine disruptors (ED) among teenage girls.

Materials & methods: Observational cross section study conducted by dept of gynaecology at PCMS and RC. 100 unmarried girls willing to participate in study were offered voluntary participation after informed consent.An online survey conducted using a structured questionnaire.

All items related to awareness about ED, daily use items containing ED and their weekly exposure, hours of screen exposure and bed time was studied. Items related to preventive measures taken by girls to avoid ED exposure was also tabulated. Questionnaire related to menstrual irregularity and any other endocrine dysfunction were also interviewed. All data were tabulated and were analyzed using descriptive statistical methods. SPSS software was used for assessment of level of significance.

Results: Most frequently used substances in day to day which had endocrine disrupting chemicals was found in personal care products.Out of 100 females 1/3rd of the females had menstrual irregularities.Out of 100 females 66% females had sleep timing after 12 am with majority screen exposure of 4-8 hours per day.Of the 30% of females who are aware of endocrinal disruptors majority were willingly adapting use of stainless steel bottles and organic cosmetics as preventive measure to reduce the use of EDC'S. In the survey which was carried out it was concluded that only 40% females had heard about endocrine disruptors. Of which > 50% had heard about bisphenols, paraben and PCB.

Conclusion: Mass education of adolescent girls spreading awareness about ED and measures to minimize their exposure is warranted. Well-designed randomised controlled trials may be warranted to study clear associations between ED and female reproductive system

Key words: Endocrine disruptors, Teenage

INTRODUCTION

Puberty represents a critical phase of developmental changes that signifies the shift from sexual immaturity to reproductive maturity. Recent observations indicate a notable decline in the age at which breast development occurs, a key early indicator of puberty in females, over the past few decades. In contrast, the age at which menarche occurs, a significant later milestone in puberty, has remained relatively stable.[1, 2] The evidence regarding the timing of puberty in males is varied; some studies suggest an earlier onset, while others report no significant changes in the age of pubertal onset in recent years. Although genetic influences are the primary factors affecting the timing of puberty, the trend towards earlier onset observed over the last century aligns with advancements in public health and nutrition. More contemporary shifts in pubertal timing have been linked to rising obesity rates. Additionally, there is speculation that endocrine-disrupting chemicals (EDCs) may play a role in the changes observed in the timing of puberty.[3, 4]

Endocrine disruptors are natural or manmade chemicals that mimic or interfere with our endocrine system and have been linked with developmental, reproductive, immunological and neurological problems. Endocrine-disrupting chemicals (EDCs) pose potential health risks through a variety of mechanisms. They can be absorbed via multiple pathways, including oral and dermal routes, and can

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impact different critical periods of development, such as prenatal and postnatal stages as well as puberty. The complexity of their chemical compositions, often existing as mixtures, complicates the assessment of their effects on human health. Furthermore, the influence of EDCs appears to extend across generations, affecting at least two to three successive generations. Puberty is particularly recognized as a crucial period of vulnerability during which the effects of EDCs may be pronounced.[5- 7]Hence; the present study was conducted for assessing awareness and attitude about endocrine disruptors among teenage girls.

MATERIALS & METHODS

The current research aimed for evaluating awareness and attitude about endocrine disruptors among teenage girls.Observational cross section study conducted by dept of gynaecology at PCMS and RC. 100 unmarried girls willing to participate in study were offered voluntary participation after informed consent.An online survey conducted using a structured questionnaire.

All items related to awareness about ED, daily use items containing ED and their weekly exposure, hours of screen exposure and bed time was studied. Items related to preventive measures taken by girls to avoid ED exposure was also tabulated. Questionnaire related to menstrual irregularity and any other endocrine dysfunction were also interviewed.All data were tabulated and were analyzed using descriptive statistical methods. SPSS software was used for assessment of level of significance.

RESULTS

Most frequently used substances in day to day which had endocrine disrupting chemicals was found in personal care products.Out of 100 females 1/3rd of the females had menstrual irregularities.

Out of 100 females 66% females had sleep timing after 12 am with majority screen exposure of 4-8 hours per day.Of the 30% of females who are aware of endocrinal disruptors majority were willingly adapting use of stainless steel bottles and organic cosmetics as preventive measure to reduce the use of EDC'S. In the survey which was carried out it was concluded that only 40% females had heard about endocrine disruptors. Of which > 50% had heard about bisphenols, paraben and PCB.

Figure 1: Menstrual irregularities in study population

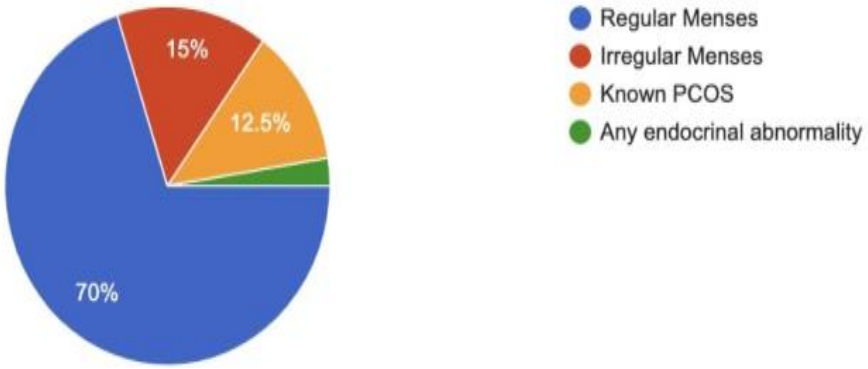

Figure 2: Hours of screen exposure on laptop or phone

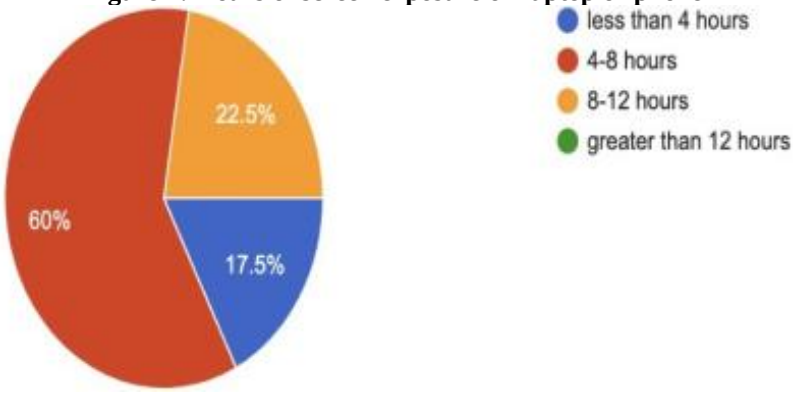

Table 1: Awareness about endocrine disruptors in study population

Awareness of endocrine disruptors	Number	Percentage
Correctly	9	9%
Had some idea	31	31%
Not aware	60	60%

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Figure 3: Awareness of Chemicals causing endocrine disruption

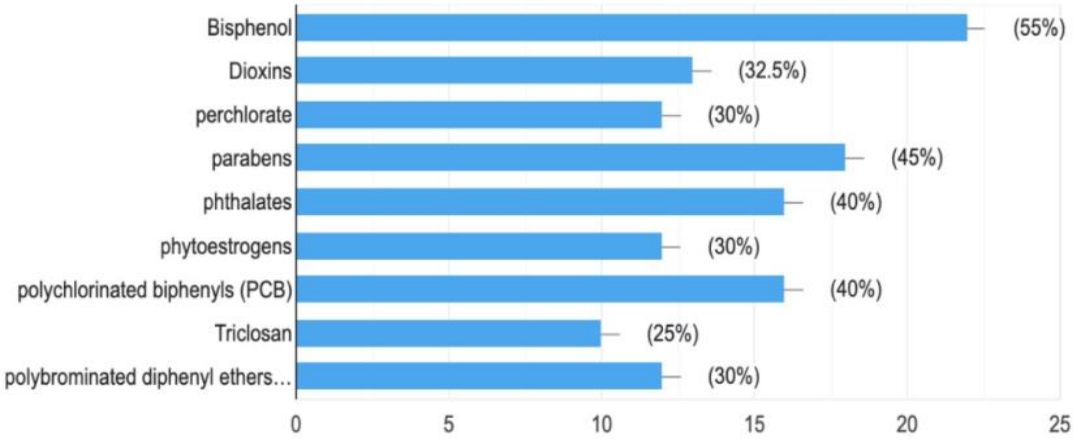
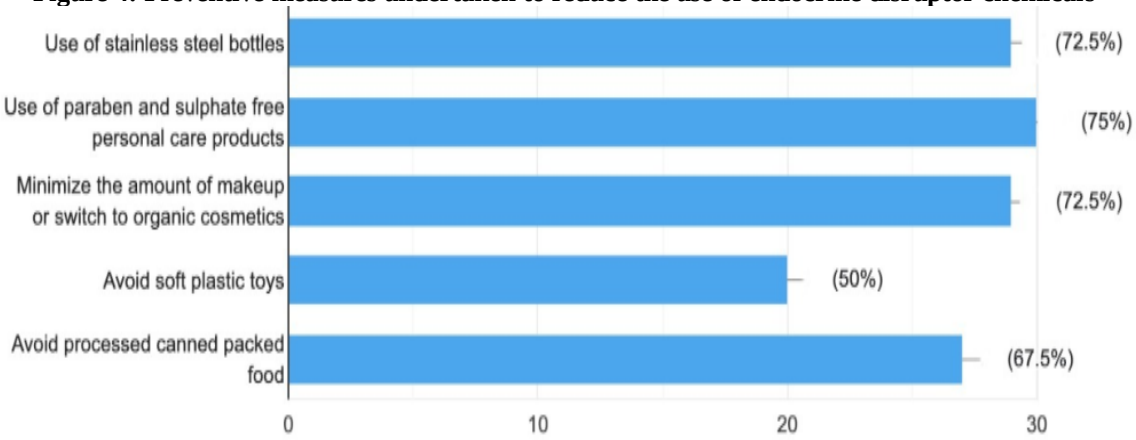


Figure 4: Preventive measures undertaken to reduce the use of endocrine disruptor chemicals



DISCUSSION

The timing of puberty is influenced by a complex interplay of factors, with genetic and epigenetic influences playing a predominant role, while environmental factors also contribute significantly, albeit to a lesser degree. Environmental determinants are critical in influencing both the initiation of puberty and the timing of menarche. Factors such as maternal and infant nutrition, chronic illnesses, and ongoing physical or psychological stress—such as exposure to violence or the adoption of a girl from a disadvantaged background—have a substantial impact on the timing of pubertal milestones. In females, the onset of puberty before the age of 8 is classified as precocious, while onset between the ages of 8 and 9 is deemed early. Precocious puberty can be categorized as central or true precocious puberty when it is dependent on gonadotropins, and as peripheral precocious puberty when it is independent of gonadotropins. Recent decades have witnessed reports from various countries indicating that girls are entering puberty at younger ages than previously documented. Concurrently, there is growing concern regarding the role of endocrine-disrupting chemicals (EDCs) in influencing the timing of pubertal onset, particularly among girls.[7- 9]In the present study, most frequently used substances in day to day which had endocrine disrupting chemicals was found in personal care products.Out of 100 females 1/3rd of the females had menstrual irregularities.Alkhalidi MF et al evaluated the awareness among females of reproductive age regarding the nature, source, as well as physiological and psychological burden associated with sex hormones disruptors.A descriptive cross-sectional study was conducted among females between the age of 15-45 years. The study included 491 females; 6.6% of them had been using soya-containing products for a long time, and 32.5% reported using oatmeal for a long time. The majority (86.2%) did not use any other hormonal therapy. There were significant differences in the knowledge about sex hormone disruptors among the participants, and women with poorer knowledge about sex hormone disruptors were significantly less likely to report the long-time usage of soya-containing food when compared to women with greater knowledge (2.2% vs. 4.2%, $p<0.001$). The results showed that women with poorer knowledge were also significantly less likely to report the usage of hormonal therapies when compared to women with greater knowledge (6.7% vs. 7.2%, $p<0.001$), indicating that the usage of these chemicals is higher in women with greater knowledge although they are aware of their effects.[10]

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In the present study, out of 100 females 66% females had sleep timing after 12 am with majority screen exposure of 4-8 hours per day.Of the 30% of females who are aware of endocrinal disruptors majority were willingly adapting use of stainless steel bottles and organic cosmetics as preventive measure to reduce the use of EDC'S. In the survey which was carried out it was concluded that only 40% females had heard about endocrine disruptors. Of which > 50% had heard about bisphenols, paraben and PCB.Steeve Rouillon et al describe women's knowledge, attitudes and behaviors towards EDC exposure. The study comprised semi-structured interviews with pregnant women, a focus group of professionals in perinatology and environmental health, and the administration of a psychosocial questionnaire comprising scores in 300 pregnant or in postpartum period women. The mean score of knowledge was 42.9 ± 9.8 out of 100 (from 13.5 to 75.7). Exposure attitude was determined by risk perception. Mean level of cues to action to reduce their EDC exposure was estimated at 56.9 ± 22.5 out of 100 (from 0 to 100). Anxiety was significantly increased after the questionnaire. Anxiety about EDC was associated with a high score of knowledge (OR = 2.30, 95% CI (1.12–4.71)) and with no pregnancy anxiety.Their findings suggest that healthcare providers should consider pregnant women's knowledge and perceptions, possibilities of action, and be careful not to increase their anxiety when advising them about EDC and environmental exposure.[11]

CONCLUSION

Mass education of adolescent girls spreading awareness about ED and measures to minimize their exposure is warranted. Well-designed randomised controlled trials may be warranted to study clear associations between EDand female reproductive system.

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