

Integration of Adolescent Health Needs Into Primary Health Care Services: Designing Care Model

Introduction

Adolescence is the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. Adolescent in this period undergoes major physical and psychological, social interactions and relationships changes. Globally, 1.2 billion people aged 10 to 19. According to Central Agency for Public Mobilization and Statistics (CAPMAS) (2015), 9.4% of population in Egypt aged 10- 14 years while 9.7% aged 15-19 years ^{[1], [2]}.

Adolescent face many health issues which include: Early pregnancy and childbirth, HIV, other infectious diseases as diarrhea, lower respiratory tract infections and meningitis. Also, Violence, alcohol, drugs and Tobacco uses considered a health problem ^[3]. For adolescent health education, specific plans should be taken in adolescent health promotion program ^[4].

Mental health issues are among the leading risk factors for death, such as suicides, and causes of disability-adjusted life years. In a recent study in Egypt about the prevalence and risk factors of anxiety disorders in an Egyptian sample of school and students at the age of 12-18 years it was found that the positive clinical cases from the studied sample represented 20.6%, depression is the most prevalent 23.8%, anxiety was 6.69% ^[1].

Parts of the challenges facing adolescents worldwide include early pregnancy, unmet family planning methods, and high rates of HIV and sexually transmitted infections. Multiple political, financial, and cultural factors hinder the delivery of information and services; healthcare providers usually act as a barrier to care by failing to provide young people with supportive, adolescents-friendly services ^[6].

Unhealthy diets associated with overweight and obesity which are one of the key risk factors associated with non-communicable disease, particularly cardiovascular disease and diabetes ^[1]. (2014), 9.9% male In Egypt and 8.5 are obese in aged 10-14 years ^[1].

Every day more than 350 adolescents who have tried cigarettes become new regular, smokers. This is because nicotine is a highly addictive substance; and adolescents, are particularly susceptible to its effects ^[7].

Injuries due to accidents are the main cause of mortalities in adolescents. Between the ages of 10 and 19, mortality caused by accidents rises significantly with male predominance ^[8].

Adolescent's violent behavior is one of the major worldwide public health problems that associated with dangerous physical and psychosocial effects^[9].

Primary health care, as defined by Alma Ata is “essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination”^[10].

Adolescents have significant needs for health services. They pose different challenges for the health-care system than children and adults, due to their rapidly evolving physical, intellectual and emotional development. There are many health problems that are often neglected include mental health disorders, substance use and substance use disorders, intentional and unintentional injuries and chronic illness. Adolescents often find mainstream primary care services unacceptable because of perceived lack of respect, privacy and confidentiality, fear of stigma and discrimination, and imposition of the moral values of health-care providers ^[11].

OBJECTIVES

General objective:

The overall aim expected to be achieved from this research is to develop a design model to integrate adolescent health needs into primary health care services for improving healthcare delivery and health status of adolescents.

Specific objectives:

This research aims to:

1. Conduct a situation analysis of adolescent health needs in Assiut governorate.
2. Assess the PHC facilities (services and personnel).
3. Develop a design model to integrate adolescent health needs into primary health care setting in Assiut governorate and assess its effectiveness.

Data and methods:

Study design:

The study design is cross-sectional and quasi-experimental design (Educational intervention study) with pre and post-intervention.

Study setting:

Two districts were randomly selected and they were Assiut District (Al-arbeen) representing urban Egypt and Al-fath District (Bani-Mor) representing rural Egypt.

It was conducted in two health facilities which were selected randomly to represent PHC in Egypt

Study population:

They were all adolescents that came to the PHC centers for seeking medical advice or for utilization of any PHC service. They were eligible for participation if they fulfill the following inclusion criteria: 1. they are under the age of 19 years and over 10 at the time of meeting. 2. Informed consent is given by participant. 3. Absence of severe injuries.

Data were collected through face-to-face interviews in the period from July, 2017, to November, 2017.

Sample size:

As the prevalence of overweight in Egypt is 25%, (WHO, 2015), and with considering the overweight as the major adolescent health problem with the highest prevalence, our sample calculated by Epi- info 7 software was 288 and we added 20 % dropped out, so our sample size was 350.

Sampling methods:

At the initial visit a teen was seen by a trained physician to receive a comprehensive physical exam. He received reproductive health counseling, a mental health assessment, risk-reduction counseling, and health education. On average, this first visit lasts an hour and a half, and a major focus was facilitating engagement.

Data collection:

Face to face interview structured questionnaire was used in the present study, which was developed according to evidence –based questioners as the short version of Depression Anxiety Stress Scales (DASS) ^[12] and Maudsley Violence Questionnaire (MVQ) ^[13]. It also based on national based questioners as DHS surveys ^[14].

DAAS score is based on that anxiety disorders and depression need to be distinguished from adjustment disorders ^[12].

MVQ is a 56-item true/false questionnaire with a score from 0-56. It measures the violence attitudes.

Prior to application, the questionnaire was reviewed by a team of 2 academic physicians and one academic nurse to assess the relevance and framing of the questions as well as accuracy of the Arabic translation. Then, the questionnaire was pilot-tested on 50 adolescents to ensure that the questioner was understandable to all studied sample.

The questionnaire was divided into multiple modules, namely; socio-demographic data, health care services and knowledge, attitude and situation analysis of the following items:

Mental health: questions directed to measure knowledge about mental illness, mental stigma and the role of PHC in mental health.

Questions of reproductive health measured the family planning methods, HIV disease and early pregnancy complication.

Nutrition module measured the nutrition habits of the adolescents, anemia causes and prevention and obesity causes and hazards.

Smoking and addiction module measured the knowledge about smoking and addiction adverse effect.

Accidents module asked about how adolescents were aware about prevention of accidents and motor car injuries.

Violence module used MVQ to predict the violence attitude of the studied sample.

The total sample of the adolescents was 350 was tested by the pre-test questioner. One hundred and seventy five were chosen randomly for receiving the health educational program and the other 175 was considered as control group.

The questionnaire was administered as a pre-intervention (stage 1); an educational intervention phase was implemented (stage 2) and immediate post intervention questionnaire (stage 3) was administered to evaluate the immediate impact of the educational program. The whole adolescents receiving the intervention returned after 3 months to evaluate the long term effect of our health education program with a response rate of 100% while 174 from control group return with a response rate of 99.4% (stage 4).

Designing model (*Health is our choice*) consists of main 3 pillars:

1-Comprehensive clinical examination

2-Screening of anemia, D.M and obesity.

3-Detailed health education about mental health, healthy nutrition, reproductive health. Smoking & addiction, accidents and violence.

The educational program phase is a behavioral prevention intervention based on Guidelines for Adolescent Preventive Services (GAP). It was applied under the address of “*Health is our Choice*” and aiming to educate adolescents the most important items related to mental health, reproductive health, nutrition, smoking and addiction, accidents and violence. The program had been strengthened by a colorful educational booklet and posters. Each respondent from the adolescents received colorful educational booklet as a gift to attract the adolescents to the booklet content.

Health educators were selected from qualified health providers in the same PHC in which the intervention was implemented. They received a course of how to deal with adolescents’ health needs. The content of the colorful educational booklet was illustrated to them in details to help them being more fit for adolescent health education. The trainer of health educators were two academic public health specialists.

Weight, Height, hemoglobin and glucose level were measured in the phase 1 in which we met the adolescents for the first time.

Health care providers’ questioner asked question in the same modules of adolescent’s questioner.

Data management:

All questionnaires were revised, coded and cleaned and checked for missing and non-logic skip pattern.

Descriptive statistics were used to illustrate respondents ‘demographic characteristics. Categorical variables were measured as percentages while continuous variables were expressed as mean \pm standard deviation. The Shapiro test was applied to determine the nature of distribution.

Scores were used to evaluate adolescent’s knowledge. Questions were scored as 1 marks for correct answer and 0 marks for wrong or no answer or in refusing to answer.

Mann–Whitney U test and independent T-test were performed to compare binary variables with knowledge and attitude scores. Kruskal–Wallis test was used to compare the knowledge and attitude scale scores with multiple variables. Wilcoxon test used to evaluate the effect of health education program by difference between pre and post intervention level of knowledge. McNemar’s test was used to show in details the success of our interventional

educational program. Chi-square tests and Fisher Exact test were used to investigate possible differences in the studied sample.

DAAS for mental health and Maudsley score for violence were tested for evaluating their reliability. SPSS statistical package version 16.0 was used for statistical analysis with 5% level of significance.

Coordination, monitoring and quality control

The Principal investigator and the co investigators supervised all steps of the project to ensure proper scientific data collection & data management, quality control was 10%.

Results

Table 1: Background Characters of Adolescent in Bani-Mor and Alarbeen PHC Units in Assiut.

Variables		Total Sample	Intervention received group N (%)	Control group	P-value
Age group	10-13	205(58.5)	92(52.6)	113(64.6)	0.06*
	14-16	94(26.5)	52(29.7)	42(24.0)	
	17-19	51(14.5)	31(17.7)	20(11.4)	
Sex	Male	118(33.7)	49(28.0)	69(39.4)	0.03*
	Female	232(66.3)	126(72.0)	106(60.6)	
Education	Illiterate	8(2.3)	7(4.0)	1(0.6)	0.06**
	Educated	342(97.7)	168(96.0)	174(99.4)	
Type of place	Rural	177(50.6)	88(50.3)	86(49.1)	0.83*
	Urban	173(49.4)	87(49.7)	89(50.9)	
Religion	Muslim	297(84.9)	144(82.3)	153(87.4)	0.23*
	Christian	53(15.1)	31(17.7)	22(12.6)	
Work	Yes	25(7.1)	18(10.3)	7(4.0)	0.03*
	No	325(92.9)	157	168	
Marital status	Single	350(100.0)	175(100.0)	175(100)	-
	Married	0(0.0)	0(0.0)	0(0.0)	
Family income	Less than 1000 pound	50(14.3)	22(12.6)	28(16.0)	0.55**
	1000-5000	7(24.3)	42(24.0)	43(24.6)	
	More than 5000	85(2.0)	5(2.9)	2(1.1)	
	I Don't know	208(59.4)	106(60.6)	102(58.3)	
Hg Status	Anemic	155(44.4)	86(49.1)	69(39.4)	0.06*
	Not anemic	195(55.7)	89(50.9)	106(60.6)	
Weight(kg)	Mean ± SD	43.36±11.3	43.8±12.1	42.9±10.4	0.70***
Height (cm)	Mean ± SD	143.0±12.1	142.8±11.7	143.1±12.5	0.71***
Hemoglobin(g/dl)	Mean ± SD	11.98±0.9	11.9±0.98	12.0±0.84	0.05***
Glucose(gm.)	Mean ± SD	98.08±19.0	98.4±21.9	97.6±15.6	0.92***
BMI	Mean ± SD	21.09±4.6	21.2±4.3	20.9±5.0	0.25***

N=350

*Chi square test**Fisher Exact test***Mann Whitney test

Three hundred and fifty respondents participated in the project. Of these, 92 of cases (52.6%), and 113 controls (64.4%) were between the ages of 10–13years. Only 2, 3% of the studied sample were illiterate. Twenty four (24%) of cases and controls had an average family monthly income from 1000-5000 pound. The remaining demographics and difference between the two groups are reported in table 1

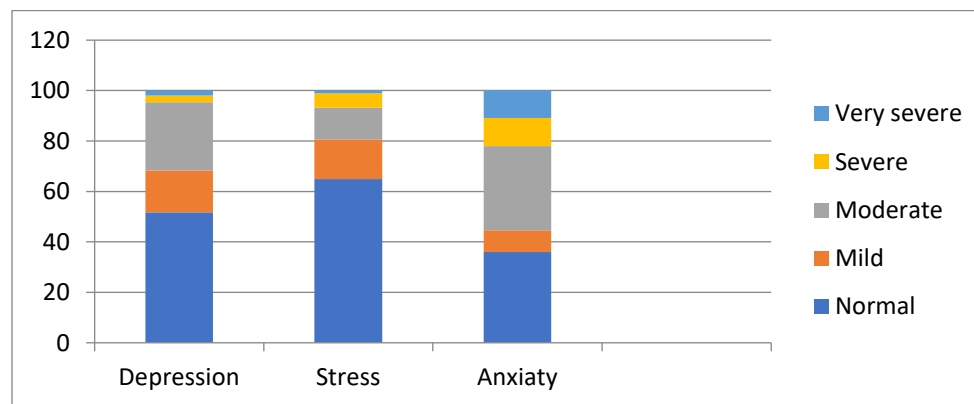
Table 2: Prevalence of obesity and overweight in adolescents.

Underweight		Normal weight		Overweight		Obesity	
Female	Male	Female	Male	Female	Male	Female	Male
n= 232	n=118	n= 232	n=118	n= 232	n=118	n= 232	n=118
n (%)		n (%)		n (%)		n (%)	
9(5.1)		178(76.7)		31(13.4)		14(6.0)	
6(3.9)		104(88.1)		4(3.4)		4(3.4)	
*P-value=0.58		*P-value=0.01		*P-value=0.002		*P-value=0.44	
Total =350		15(4.3)		282(80.6)		35(10)	
						18(5.1)	

*Fisher exact test

Table 2 shows the prevalence of overweight and obesity in adolescents. Underweight presented in 4.3% of the studied sample. Overweight was more prevalent in female (13.4%) than male (3.4%). All over sample of obesity in the studied sample was (5.1%). Overweight was calculated as BMI > 85th and less than 95th percentile for age and sex while obesity was calculated as BMI > 95th percentile.

Figure1: Result of the Short Version of DAAS Score for Mental Health in adolescents.



The Figure 1 shows the results of DAAS mental score in the studied sample. Regarding anxiety, 33.4% from adolescent had moderate level of anxiety. Half of the samples were suffering from various level of depression. More than 60% of the adolescents were living with normal level of stress.

Table3: Effect of health education intervention on adolescent knowledge and behavior (Immediate and late evaluation).

Modules	Max. points of each module	Late test evaluation			Immediate test	Late test	P-value
		Intervention received group	Control group	P-value	Intervention received group	Intervention received group	
					Mean±(SD)	Mean±(SD)	
Mental Health	17	9.9(1.8)	4.4(3.7)	0.00	9.8(1.8)	9.9(1.8)	0.81

Reproductive Health	30	18.8(3.2)	5.1(2.9)	0.00	18.6(3.4)	18.8(3.2)	0.97
Nutritional Health	26	16.2(2.2)	7.5(3.0)	0.00	14.8(2.3)	16.2(2.2)	0.00
Smoking /addiction	17	9.1(2.8)	3.0(2.1)	0.00	8.0(2.5)	9.1(2.8)	0.00
Accidents	5	4.2(0.7)	3.4(1.0)	0.00	4.5(0.65)	4.2(0.7)	0.003
Violence attitude	56	19.7(8.6)	22.1(10.1)	0.00	-**	19.7(8.6)	-

*Using Wilcoxon test for non-parametric data

**Violence score was not done in the immediate post –test

The knowledge scores of all modules were significantly better among adolescents in intervention received group than control group in late evaluation. The topics were mental health, reproductive health, Nutritional health, smoking / addiction, accidents and violence. Violence attitude is lower in intervention received group as more score mean more violence. Difference between immediate and late test evaluation were not significant in mental and reproductive health knowledge while it were significant in the other modules. The knowledge increased more in late evaluation in the nutrition and smoking /addiction modules but decreased in accident module.

Table 4: Health providers knowledge score with selected demographic characteristics

Characteristics	Mean Rank		P-value
Years of experience	≥ 10 years	18.8	0.24*
	<10 years	14.6	
Type of place	Urban	14.7	0.08*
	Rural	20.5	
Marital status	Single	10.6	0.14*
	Married	18.4	
Previously attended training courses	Yes	19.7	0.30*
	No	16.1	
Job of health provider	Doctor	Mean SD=35.2± 3.2	0.11**
	Nurse	Mean ±SD=43.2± 11	
Total sample of health provider	34	Mean ±SD=42.0± 10.4	
Total Level of knowledge	Low	9(26.5%)	
	Middle	14(41.2%)	
	High	11(32.4)	
Max. points of knowledge score =94			

*Using Mann-Whitney test for non-parametric data. **Using independent T-test for parametric data.

Table 4 shows that the mean of knowledge score was 42.0. 26.5% of health providers have low level of knowledge. No difference in knowledge score between urban or rural, single or married, doctor or nurse, previously attended training courses or not or years of experience.

Table 5 shows the difference between urban and rural PHC as perceived by adolescents and its significant value. Generally there are high levels of satisfaction among adolescents among most of PHC services. Regarding the differences between urban and rural, the findings indicated that there were significant variations in most items especially regarding pharmacy and patient transfer to another health facility.

Table 5: Differences between Urban and Rural PHC Services' Quality as Perceived by Adolescents.

Table 3: Differences between Urban and Rural PHC Services Quality as Perceived by Adolescents						
Service availability		Site of PHC				P-value*
		Rural		Urban		
		N	%	N	%	
The place of PHC						
PHC is easily accessible	Yes	163	93.7%	168	95.5%	0.46
PHC provides leaflets or educational and health materials	Yes	152	87.4%	124	70.5%	0.001
Suitable waiting places	Yes	141	81.0%	163	92.6%	0.001
The rules and regulations within the PHC are respected	Yes	135	77.6%	166	94.3%	0.001
Air conditioner	Yes	127	73.0%	91	51.7%	0.001
General cleanness	Yes	133	76.4%	158	89.8%	0.001
Bathroom cleanness	Yes	136	78.2%	119	67.6%	0.02
Health care providers						
Presence of doctors in working hours	Yes	136	78.2%	153	86.9%	0.03
Your doctor has examined you in detail	Yes	137	78.7%	103	58.5%	0.001
your doctor Just asks about your illness without examination	Yes	141	81.0%	68	38.6%	0.001
The doctor explains the cause of the medical tests if you are asked	Yes	149	85.6%	120	68.2%	0.001
Your inquiries are answered immediately by your doctor or nurse	Yes	149	85.6%	160	90.9%	0.12
You are satisfied with the service you received in the laboratory or radiation	Yes	151	86.8%	152	86.4%	0.92
Your doctor / nurse treats you in a polite way	Yes	152	87.4%	165	93.8%	0.04
Your doctor / nurse will advise you on how staying healthy	Yes	157	90.2%	163	92.6%	0.42
Doctors take care of privacy during clinical detection	Yes	150	86.2%	143	81.2%	0.20
Time						
The time I waited before receiving care is long	Yes	130	74.7%	57	32.4%	0.00
Working hours in health care centers are adequate	Yes	146	83.9%	154	87.5%	0.42
Drugs and medicines						
Medications prescribed by doctors are available at the PHC pharmacy.	Yes	158	90.8%	155	87.5%	0.42
Your health care provider has given you instructions on using the medicine.	Yes	146	83.9%	153	86.9%	0.001
Your health care provider has given you instructions to store the medicine.	Yes	98	56.3%	47	26.7%	0.001
The health care provider has explained the potential adverse effects of the drug.	Yes	81	46.6%	19	10.8%	0.001
Referral of the patients in PHC						
Your doctor has transferred you to another health center (hospital or clinic)	Yes	152	87.4%	29	16.5%	0.001
The reasons for being referred to another health have been explained.	Yes	145	83.3%	26	14.8%	0.001
After receiving medical service and treatment, your health has improved.	Yes	161	92.5%	163	92.6%	0.9

*P-value by chi square test.

Discussion

This is the first known study to be conducted in Egypt that comprehensively demonstrates adolescents' knowledge, attitudes, and practices toward major health problems facing the adolescents.

There was higher female predominance in the sample compared to males, which may be reflective of more general patterns of PHC services utilization^[15].

One of the important results of this study was that 44% of the adolescents were anemic. This finding resembles the result produced by an Egyptian study in Upper Egypt among adolescents which was 40%^[16].

Obesity and overweight prevalence was 15.1% demonstrating the existence of the burden of overweight and obesity among adolescents in Egypt. Overweight represented 10% in the studied sample while obesity was 5.1% .This prevalence resembles that was detected by another study on the Egyptian adolescents in which overall prevalence of overweight and obesity was 12.1 and 6.2%, respectively^[17].

DAAS score for mental health in the present study emphasis the terrifying fact that depression is prevalent among adolescents. Nearly the half of the studied sample was suffering from depression varying from mild up to very extremely severe depression. This percentage is higher than the worldwide adolescent depression prevalence which ranging from 15-20% among adolescents between the ages of 14-19 years ^[1]. This may be explained by the fact that our study is PHC based study and the adolescents who come to utilize health services may be suffering from diseases that make them having depression^[18].

The present study demonstrates that health knowledge and attitude regarding adolescents' health was unsatisfying before program implementation. After implementation, there was a significant increase in knowledge among the adolescents in the intervention received group than the control group. Similar findings demonstrated the role of health education in positive changing adolescents' knowledge and attitude as the study that was conducted in Brazil and reported improvements in health practice as decreasing consumption of sweets, in a group of 150 adolescent, who participated in the health education intervention program ^[19].

Substantial deficits in adolescents' health knowledge and practice in all study modules was remarkably obvious. This is consistent with a study that was conducted in Sri-Lanka and reported the same finding among students aged 16–19^[20].

Role of health education in improvement the population health is well established fact and the link between education and health was proven on evidence based basis [21].

Although the period of adolescence is markedly exposed to deep dynamic changes, it is often neglected by health care providers [4]. We surveyed the knowledge of Egyptian health care providers (nurses and doctors) toward most important adolescents' health issues. A 94-item questionnaire, that was given to 34 health providers in urban and rural PHC, revealed low level of knowledge in a quarter of the sample regarding mental health, reproductive health, nutrition, Smoking/addiction and accidents. "Situation analyses and needs assessment exercises carried out in different parts of the world point to shortcomings in their professional capabilities and in their 'human qualities' as a result of which they are unable and oftentimes unwilling to deal with adolescents in an effective and sensitive manner" said WHO [1].

No significant difference detected in our health provide sample between urban and rural health providers, between ≥ 10 years' experience or less than 10 years, between doctor and nurse, between single and married or between health providers who was received training course or who was not received. This is not consistent with a study in India that showed that doctors were more aware than paramedical staff regarding adolescents' health [22]. It is also not in line with a study on 3 rural western countries that concluded that rural health worker were less in knowledge score than urban counterparts as rural public health personnel were less likely to have formal public health training and experience [23].

As overall view, there was an average level of satisfaction in adolescents from PHC services. More than 90% of the studied samples felt improvement in their health after receiving treatment in PHC and more than 85% were satisfied with the service they received in the laboratory or radiation department. More than 80% saw that medications prescribed by doctors are available at the PHC pharmacy. The majority of adolescents satisfied about the privacy that doctors dealt by it. Also, more than 80% saw that working hours in PHC are adequate and more than 90% agreed that PHC is easily accessible with no differences in these items between urban and rural adolescents.. Differences between urban and rural PHC services were shown clearly in that urban PHC was better regarding suitable waiting places, rules and regulations within the PHC are respected, general cleanness, presence of doctors in working hours and that doctors treat them with polite way. Rural PHC was better in presence educational and health materials, Air conditioner, bathroom cleanness, the health care provider has explained the potential adverse

effects of the drug, the doctor explained the cause of the medical tests if asked, doctor gave instructions to store the medicine, doctor when examined them, he examined in details. Adolescents in rural PHC were more suffering from that doctor just asks about illness without examination and that time they waited before receiving care is long. Our result is not in line with the study that was done in Ethiopia that cleared that adolescents' health service use and satisfaction were low^[24] and this explained by that Egypt has excellent allocation of PHC facilities throughout the country that considered a source of pride to the Ministry of Health^[25]. Adolescents' satisfaction on the PHC service is important to increase utilization of these services [24].

Conclusion

In the light of the study results, it can be concluded that adolescents lacked adequate knowledge about their health in the pre-program phase. Adolescents' knowledge, habits and beliefs were mostly inadequate as regards mental health, reproductive health, healthy nutrition, smoking/addiction accidents and violence. After implementation of the program (*Health is our choice*) remarkable improvement were achieved in adolescents' knowledge and practice. Therefore the educational program was successful in achieving its goals of favorable impact in the knowledge, habits and beliefs owned by Adolescents.

Recommendation

- Adolescents' health education about issues related to their health is a valuable matter, so that they can safeguard themselves against mortalities and morbidities.
- Any primary health care centers (PHCC) should provide comprehensive health education for adolescent using various educational media through lectures, workshops, face to face interview and media and attract this target group by colorful booklets and posters.
- To be most successful, public health interventions need to address all the health problems threaten adolescent's quality of life and take action on many fronts – including public policies, local communities and families and adolescents themselves.
- Strengthening health care providers' knowledge and practices is essential in meeting adolescents' health needs as they have significant influence on adolescents' health promotion.
- Mental disorders and mental health problems are growing rapidly among adolescents so general practitioners must take a fundamental role in diagnosing such problems in order to reduce the overall burden of adolescent mental health problems.

- Nutrition awareness education and anemia prevention education should be given to the both parents and adolescents.
- The better preventive plan for obesity and overweight is to prevent children with a normal BMI from being overweight or obese. Preventive strategies should start as early as possible. The strategies must be based on the individual, community and physician's efforts.
- Addressing the sexual and reproductive health of adolescents by programs to provide adolescents with perfect sexual and reproductive health care with related information, education, support and counseling.
- Health care providers should be aware about the effects of media influences on adolescents' violent attitude and mental health.
- In Egypt, we need urgent attention tackle the problem of adolescent injury by motor car accidents.
- Health plans should promote accurate screening by primary care physicians for smoking, substance abuse and alcohol abuse. These physicians are usually the first health care professional being in contact with adolescents.
- Periodic screening of adolescents for anemia, diabetes and obesity must be done in PHC centers.
- Improving the quality of health care services for adolescent clients by designing health services that can attract the adolescents, create special atmosphere to discuss sensitive health with adolescents for health promotion and prevention.

References

- [1] **World Health Organization. (2006).** Orientation programme on adolescent health for health care providers.
- [2] **UNICEF. (2014).** Children in Egypt: a statistical digest, June 2014. *UNICEF Egypt, Cairo, Egypt*. Retrieved from www.unicef.org/egypt
- [3] **World Health Organization. (2010).** Strengthening the health sector response to adolescent health and development. *Geneva: World Health Organization*.
- [4] **Abedian, K., &Shahhosseini, Z. (2015).** Barriers to health education in adolescents: health care providers' perspectives compared to high school adolescents. *International journal of adolescent medicine and health*, 27(4), 433-436.

- [5] Ismail, A., Abdelgaber, A., Hegazi, H., Lotfi, M., Kamel, A., & Ramdan, M. (2015). The Prevalence and Risk Factors of Anxiety Disorders in an Egyptian Sample of School and Students at the Age of 12-18 Years. *J Psychiatry*, 18(5), 1-5.
- [6] Morris, J. L., & Rushwan, H. (2015). Adolescent sexual and reproductive health: The global challenges. *International Journal of Gynecology & Obstetrics*, 131(S1).
- [7] General surgeon. (2014). The health consequences of smoking—50 years of progress: a report of the surgeon general. In *US Department of Health and Human Services*.
- [8] ACC Tursz, A., Courtecuisse, V., Jeanneret, O., & Sand, A. (1986). Risk-taking behavior and accidents in adolescence in developed countries. *Revue d'epidemiologie et de sante publique*, 34(2), 81-88.
- [9] Sousa, S., Correia, T., Ramos, E., Fraga, S., & Barros, H. (2010). Violence in adolescents: social and behavioural factors. *Gaceta Sanitaria*, 24(1), 47-52.
- [10] World Health Organization, & UNICEF. (1978). International Conference on Primary Health Care: Alma Ata, USSR, 6-12 September 1978= Conférence internationale sur les soins de santé primaires: Alma Ata, URSS 6-12 septembre 1978: List of participants= liste des participants.
- [11] World Health Organization. (2015). A standards-driven approach to improve the quality of health-care services for adolescents: policy brief.
- [12] Lovibond, P. F., & Lovibond. (1995). Manual for the depression anxiety stress scales. *The Psychology Foundation of Australia Inc*.
- [13] Walker, J. S. (2005). The Maudsley Violence Questionnaire: initial validation and reliability. *Personality and Individual Differences*, 38(1), 187-201.
- [14] Ministry of Health and Population [Egypt]. (2014), El-Zanaty and Associates [Egypt], and ICF International. Egypt Demographic and Health Survey 2014. Cairo, Egypt and Rockville, Maryland, USA: Ministry of Health and Population and ICF International.
- [15] Alfaqeeh, G., Cook, E. J., Randhawa, G., & Ali, N. (2015). Access and utilisation of primary health care services comparing urban and rural areas of Riyadh Province, Kingdom of Saudi Arabia. *BMC health services research*, 17(1), 106.
- [16] Mousa, S. O., Higazi, A. M., Saleh, S. M., & Ali, H. A (2016). Cognitive Function and School Achievement in Adolescent Egyptian Girls with Iron Deficiency and Iron Deficiency Anaemia.

- [17]Salazar-Martinez, E., Allen, B., Fernandez-Ortega, C., Torres-Mejia, G., Galal, O., &Lazcano-Ponce, E. (2006).Overweight and obesity status among adolescents from Mexico and Egypt. *Archives of medical research*, 37(4), 535-542.
- [18]Goodwin, G. M. (2006).Depression and associated physical diseases and symptoms. *Dialogues in clinical neuroscience*, 8(2), 259.
- [19]Viero, V. D. S. F., Farias, J. M. D., Ferraz, F., Simões, P. W., Martins, J. A., &Ceretta, L. B. (2015). Health education with adolescents: analysis of knowledge acquisition on health topics. *Escola Anna Nery*, 19(3), 484-490.
- [20] Melhado, L. (2015). Low Levels of Sexual and Reproductive Health Knowledge Found Among Students in Sri Lanka. *International Perspectives on Sexual and Reproductive Health*, 41(1), 54.'
- [21]Baker, D. P., Leon, J., Smith Greenaway, E. G., Collins, J., &Movit, M. (2011). The education effect on population health: a reassessment. *Population and development review*, 37(2), 307-332.
- [22]Kumar, T., Pal, P., &Kaur, P. (2017).Health seeking behaviour and health awareness among rural and urban adolescents in Dehradun District, Uttarakhand, India. *International journal of adolescent medicine and health*, 29(2).
- [23]Rosenblatt, R. A., Casey, S., & Richardson, M. (2002). Rural–urban differences in the public health workforce: local health departments in 3 rural western states. *American Journal of Public Health*, 92(7), 1102-1105.
- [24]Dagnew, T., Tessema, F., &Hiko, D. (2015). Health service utilization and reported satisfaction among adolescents in Dejen District, Ethiopia: a cross-sectional study. *Ethiopian journal of health sciences*, 25(1), 17-28.
- [25]Nichols, A. W. (1981).Primary Health Care in the Middle East. *Tropical doctor*, 11(4), 166-173.