
Prevalence, Co-Occurrence and Correlates of Unhealthy Behaviors: Secondary Analysis of Survey of Young People In Egypt "SYPE", 2014

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Abstract

Objectives: The present study aimed to identify the prevalence, and socio-demographic correlates of the isolated and simultaneous presence of health risk behaviors among youth aged 13 – 35 years in Egypt. **Methods:** The Survey of Young People in Egypt (SYPE), was conducted in 2014. This survey included 10,916 youth representing total Egypt. Selection of non-communicable diseases (NCDs) health risk behaviors and their explanatory variables of youth aged 13-35 years were used for secondary and advanced analysis. **Results:** The health risk behaviors with the highest prevalence were inadequate fruits and vegetable intake (89.7%), inadequate physical activity (49%), excess salt intake (44.2%), and smoking (13.2%). Eighty percent (80%) of youth had two or more simultaneous non-communicable diseases (NCDs) risk behaviors. By applying logistic regression analysis, age (tend to accumulate as adolescents grow older) and females were statistically associated with co-occurrence of health risk behaviors. Lower Egypt was the least geographic region of aggregation of risk behaviors. **Conclusion and recommendations:** A high prevalence of NCDs health risk behaviors among youth was found in Egypt, both isolated and simultaneously which could expect a significant increase in NCDs in the near future. Multi-sectoral integrated approach to encourage people to adopt healthy behaviors on individual-and population-level is recommended.

Key words: Risk behavior, Youth, SYPE, Egypt.

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Introduction:

Lifestyle is one of the major determinants of health. Modifiable life style risk behaviors such as smoking, unhealthy diet, physical inactivity and alcohol misuse are the leading causes of these major NCDs worldwide.¹ Engaging in multiple risk behaviors is associated with greater risk of chronic disease and mortality.² In Egypt, the NCDs are estimated to account for 85% of total deaths (mainly CVDs; 46%).³

Many behaviors are established during adolescence and continue into adulthood.⁴ The prevalence of NCDs is related to unhealthy behaviors and practices typically initiated in

adolescence, yet they are a natural partner for preventing NCDs.⁵

Health promotion activities among adolescents and young adults should be carried out, aiming at facilitating their adoption of health-promoting behaviors and eventually reducing chronic morbidity and premature mortality at a later age.¹ Greater effort are being targeted at multiple health behavior change (MHBC). Analyses of aggregation of multiple behaviors may help future health promotion programs.⁶ The present study aimed to identify the prevalence and socio-demographic correlates of single and combined non-

communicable diseases (NCDs) (mainly cardiovascular (CVDs) health risk behaviors among youth aged 13 – 35 years in Egypt.

Methods:

Survey of Young People in Egypt (SYPE), 2014 was conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS) and Population Council. Data from population-based household survey (SYPE), 2014 were (down loaded from internet) used in this study. The SYPE adopted a multistage stratified cluster sampling all over Egypt to select 10,916 eligible young people aged 13-35 years. An interview questionnaire was used to collect detailed data related to education, employment, migration, health, risky behaviors, violence, family formation, social issues, and civic and political participation. Selection of the health risk behaviors and their explanatory variables of youth aged 13-35 years for secondary and advanced analysis was used in this study. Details of the study methodology have been published elsewhere.⁷

Recoding of the variables so that the responses are changed into zero and one (one for doing the risky behavior and zero for not doing the behavior). To identify the simultaneous presence of risky behaviors, summation of the related variables for each respondent was performed.

Definition of the variables: *Smoking:* SYPE, 2014⁷ considered respondent ever smoker if he /she is currently smoking, currently smoke occasionally, tried some puffs, or smokes tobacco products other than cigarettes daily (Q4207). The same definition was followed by this study. *Alcohol consumption and drug use:* if the respondent tried any alcoholic drinks (beer or wine) (Q4215) or if the respondent has experimented with any drugs before (Q4221). *Physical inactivity:* this included a series of

questions asking respondents about their daily physical activities, including biking and walking, going to a gym, playing sports at home or in club or in youth center, playing football on the street or physical work on the job (Q4250). SYPE, 2014⁷ considered respondents who do not engage in any daily physical activity as physically inactive whereas those engaged in one or more of these physical activities were considered physically active. The same classification was followed by this study. *Internet hours per day:* how many hours would the respondent spends online per day (Q5903). Similar to other studies^{8,9}, the adolescent was considered at risk when he/she reported two or more hours on line every day. *Frequency of intake of different food items:* last week, how often did the respondent eat sweets, fast foods, soft drinks, fruits, fresh or cooked vegetable (Q4199). The answers were none, 1 – 3 times and > 3 times. Recoding of the variables were done so that the first two answers became one category (< 4times/ week). Comparison between both categories (<4 times and ≥ 4 times /week) was performed. *Excess salt:* does the respondent like his/her food very salty? (Q4197) and how often did the respondent eat pickled vegetables last week (Q4199). *Wealth level:* SYPE, 2014 constructed a wealth score using factor analysis based on household-asset ownership and housing characteristics. Based on their wealth scores, households were divided into wealth quintiles.⁷ The same wealth level was used in this study with recoding of the first and second quintiles to form the high level and the third level constituted the middle level and recoding of the fourth and fifth quintiles to form the low wealth level. *Education:* Recoding of the primary and preparatory education was done to form the basic education. Also, recoding of secondary and higher education to form one category (secondary and higher).

Statistical analysis: The prevalence of isolated and simultaneous behaviors was performed. The proportion differences between categories were evaluated by a Chi square test. Multivariate logistic regression analysis was performed for significant variables. SPSS, version 20 were used for data analysis. P value less than 0.05 was considered significant.

Results

Table (1) shows mainly NCDs modifiable risk behaviors; 13.2% are ever smokers (11.4% are current smokers; data are not shown), 2.1% tried alcohol or drugs in the past years, about half of the respondents (49%) are physically inactive, 11.8% used internet two hours or more per day and 44.2 and 9.2% consume excess salts and sweet in their diet. Smokers and those who use alcohol or drugs were more likely to be males, older, residing in urban areas and urban governorates, had basic education and employed respondents. The highest rates of smokers were observed among employed respondents (32.7%) and males (28.1%). The highest rates of physical inactivity were observed among females (61.5%) and residents of informal areas (60.9%). Those who used internet ≥ 2 hours per day were more likely to be males, younger, residing in urban areas and Urban governorates, of higher wealth level, and had secondary or higher education. The highest rates were observed among Urban governorates (24.5%) and urban areas (21.2%). Those who took excess salt were more likely to be residing in informal areas and urban governorates. Those who ate excess sweet were more likely to be females, younger, residing in urban areas and Urban governorates, of higher wealth level, had secondary or higher education and unemployed respondents.

Table (2) shows mainly eating habits: about 90% are consuming fruits and

vegetables less than 4 times per week. They were more likely to be residing in urban areas and urban governorates, of middle wealth level and illiterate respondents. Those who took excess soft drinks (11.3%) and fast foods (8.3%) were more likely to be males, older, residing in urban areas and urban governorates, higher wealth level and had secondary and higher education. The highest rates were observed among urban governorates and urban areas. This table also shows that those with higher (79.9%) simultaneous NCDs (2 – 9) risky behaviors were more likely to be residing in informal areas (85.7%), urban governorates (86%), and female gender (81.9%) and of older age (81.1%).

Table (3) showed that about 19%, 41% and 25% of respondents had one, two or three simultaneous NCDs risky behaviors. Inadequate fruits & vegetable intake and physical inactivity were common combination (data not shown). There was a difference between genders; females had 2 or even 3 combined risk behaviors higher than males while males had four and more combined risk behaviors higher than females. Also, two and more risk factors were higher in females (81.1%) than males (78.6%). Eighty percent had two or more multiple NCDs risk behaviors, 39.1% had three or more and on average 2.3 ± 1.1 (range: 0 – 9) and only 0.9% had none

Table (4) showed by applying logistic regression analysis that, residing in Lower Egypt and urban or rural but not informal areas, younger, male gender and those of middle and high wealth level are at lower risk of developing high (2 – 9) simultaneous NCDs risk behaviors.

Table (1): Percent distribution of NCDs/CVDs risk behaviors by youth characteristics in Egypt, SYPE, 2014.

Youth Characteristics	Smoking	Alcohol or drug abuse	Physical Inactivity	Internet \geq 2 hours/day	Excess salt \geq 4 x /wk	Excess sweet \geq 4 x /wk
Gender: - Male	28.1	4.3	34.6	15.6	43.7	8.4
-Female	0.2	0.1	61.5	8.5	44.7	9.9
P value	<0.001	<0.001	<0.001	<0.001	0.301	0.005
Age:						
- 13 – 24 years	9.9	1.7	44.7	9.7	44.7	11.2
- 25 – 35 years	17.7	2.6	55.0	5.7	43.6	6.5
P value	<0.001	0.002	<0.001	<0.001	0.244	<0.001
Residence:						
- Urban	15.0	3.0	47.9	21.2	46.4	13.8
- Rural	12.5	1.6	47.5	6.6	42.0	6.8
- Informal	11.7	2.0	60.9	14.1	50.7	9.7
P value	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Region:						
- Urban gov.	17.2	3.9	46.3	24.5	50.7	16.3
- Lower Egypt	11.1	1.3	48.3	10.6	43.1	9.3
- Upper Egypt	14.7	1.7	48.0	6.6	43.5	5.7
- Frontier gov.	9.8	2.8		7.9	38.0	5.8
P value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Wealth level:						
- Low	15.0	2.3	50.4	2.1	42.8	5.2
- Middle	13.1	2.1	50.2	4.6	44.4	8.5
- High	11.7	1.8	47.3	14.4	45.3	12.8
P value	<0.001	0.251	0.006	<0.001	0.067	0.001
Education						
- Illiterate	10.3	1.3	59.7	0.0	42.6	3.8
- Basic	16.0	3.1	48.6	3.3	45.4	7.3
- 2ry or higher	12.7	1.9	47.3	16.7	44.1	10.8
P value	<0.001	<0.001	0.006	<0.001	0.263	<0.001
Employment:						
- Employed	32.7	4.9	36.9	11.2	43.8	6.7
- Unemployed	4.4	0.8	54.4	12.1	44.4	10.3
P value	<0.001	<0.001	<0.001	0.194	0.531	<0.001
Total	1437 (13.2)	222 (2.1)	5341 (49.0)	1289 (11.8)	4820 (44.2)	1005 (9.2)

Table (2): Percent distribution of some dietary and total simultaneous risk behaviors by youth characteristics in Egypt, SYPE, 2014.

Youth characteristics	Fruits/ veg. < 4 times /week	Soft drinks ≥ 4 times /week	Fast foods ≥ 4 times /week	Total simultaneous risk behaviors	
				0 – 1 risks	2 – 9 risks
Gender:					
- Male	90.0	12.7	10.6	21.5	78.5
- Female	89.5	10.1	6.4	18.1	81.9
P value	0.383	<0.001	<0.001	<0.001	
Age:					
- 13 – 24 years	89.8	13.2	10.0	21.4	78.6
- 25 – 35 years	89.5	8.7	6.1	18.9	81.1
P value	0.586	<0.001	<0.001	0.002	
Residence:					
- Urban	88.2	16.7	12.7	15.8	84.2
- Rural	92.1	8.7	6.1	23.2	76.8
- Informal	80.0	10.3	8.1	14.3	85.7
P value	<0.001	<0.001	<0.001	<0.001	
Region:					
- Urban gov.	84.5	20.0	15.3	14.0	86.0
- Lower Egypt	82.2	11.1	7.8	23.1	76.9
- Upper Egypt	88.4	7.9	5.4	20.0	80.0
- Frontier gov.	89.7	4.8	5.9	18.3	81.7
P value	<0.001	<0.001	<0.001	<0.001	
Wealth level:					
- Low	89.5	6.1	4.8	21.7	78.3
- Middle	85.5	11.0	8.0	20.7	79.3
- High	81.5	15.7	11.4	18.4	81.6
P value	<0.001	<0.001	<0.001	<0.001	
Education					
- Illiterate	89.4	4.1	2.4	20.6	79.4
- Basic	88.2	8.7	6.4	21.7	78.3
- 2ry or higher	83.5	13.4	10.0	19.4	80.6
P value	<0.001	<0.001	<0.001	0.059	
Employment:					
- Employed	89.0	11.1	9.5	21.2	78.8
- Unemployed	90.0	11.4	7.8	19.6	80.4
P value	0.107	0.711	0.005	0.052	
Total	9780 (89.7)	1233 (11.3)	909 (8.3)	2158 (20.1)	8597 (79.9)

Table (3): Prevalence of simultaneous NCDs risky behaviors among youth in Egypt, SYPE, 2014.

No. of risky behaviors	Gender		Total* No. (%)	Descending cumulative percent
	Male No. (%)	Female No. (%)		
0	48 (1.0)	52 (0.9)	100 (0.9)	100.0
1	1018 (20.4)	1040 (18.0)	2058 (19.1)	99.1
2	1808 (36.2)	2600 (45.1)	4408 (41.0)	80.0
3	1214 (24.3)	1512 (26.2)	2726 (25.3)	39.1
4	584 (11.7)	340 (5.9)	924 (8.8)	13.8
5	213 (4.3)	158 (2.7)	371(3.4)	5.0
6	88 (1.8)	51 (0.9)	139 (1.3)	1.6
7	18 (0.3)	11 (0.2)	29 (0.3)	0.3
Total	4991(100.0)	5764(100.0)	10755(100.0)	

*Mean \pm SD = 2.3 \pm 1.1**Table (4): Logistic regression analysis for variables related to simultaneous NCDs risk behaviors among youth in Egypt, SYPE, 2014.**

Characteristics	OR (95% CI)	Significance
Region:		
- Urban gov.	1 (reference)	<0.001
- Lower Egypt	0.732 (0.605- 0.885)*	<0.001
- Upper Egypt	1.013 (0.895-1.395)	0.907
- Frontier gov.	1.113(0.831-1.233)	0.626
Gender: -		
- Female	1 (reference)	
- Male	0.864 (0.785- 0.951)*	0.003
Age:		
- Older (25 -35)	1 (reference)	
- Younger (13 -24)	0.815 (0.739- 0.899)*	<0.001
Residency:		
- Informal	1 (reference)	<0.001
- Rural	0.745 (0.613 – 0.904) *	0.003
- Urban	0.641 (0.542 – 0.759) *	<0.001
Wealth level:		
- Low6	1 (reference)	<0.001
- Middle	0.733 (0.655 - .821)*	<0.001
- High	0.827 (0.726 – 0.942)*	0.004

*Significant.

Discussion

The comparisons between different studies are difficult and limited due to used different methodological procedures, types & quantity, numbers of studied risky behaviors separately or combined, operational definition of characterizing risk factors, duration of exposures or habits; (daily, past week, typical week, week end, past month, current or ever user, ...etc.), different ages of studied samples, cultural/religious/legal background of the studied communities particularly substances uses and population-based or institution-based studies.^{8, 10-13}

The prevalence of current smoking observed in this study (11.4%; ever 13.2% much higher in males 28.1% than females 0.2%) is low particularly in females compared to that observed in other countries. For example, in Bangladesh, 48% and 17% were using tobacco products by males and females adults aged 25-34 years and 28.5% for both.¹⁴ In Nepal, 39% and 26% were using tobacco products by males and females adolescents aged 15-19 years.¹¹ In Lebanon, the prevalence of current cigarette smoking was 19.2% and water pipe was 23% among private and public university students.¹⁵ In Canada (COMPASS study), current tobacco users among school adolescent students was 13.9%.¹⁶ In university students in 23 low, middle and high-income countries the current tobacco use was (12.7%).¹⁷ On the other hand, it is higher than that reported by adolescent students (14-19 years old) in Brazil (7.6%).⁸ Globally, at least 1 in 10 younger adolescents (aged 13 – 15) uses tobacco. Several studies in different parts of the world reported higher prevalence of smoking among males than females and among older than younger adolescents.¹⁸

Alcohol /drug abuse in this study was 2.1%. This is lower than that was reported in Lebanon, where 35.4% of private and public university students were currently consuming alcohol (48.5% ever drinking).¹⁵ Also, in Brazil, alcohol consumption (having consumed alcohol in the last 30 days) among 14-19 years' adolescents was higher (30.4%)⁸ than that reported by our study. Also, it is lower than that reported in Nepal, where about 50% male and 30% female adolescents aged 15-19 years were currently abusing one or other forms of substance.¹¹ In Egypt alcohol and drug abuse are prohibited by legal, religious systems and are associated with stigma.

The results of this study found that 49% of youth had inadequate physical activity; higher in females than males. This is consistent with that reported in Canada (COMPASS study) (49.5%)¹⁶ and university students of lower and middle income countries (48.6%), but higher than that reported in high income countries (41.5 %).¹⁷ The results of this study are much lower than that reported in a worldwide study for adolescents (13-15 years old) from 105 countries, (80.3%; boys are more active than girls).¹⁹ This is also lower than that reported in Brazil (65.1%) among 14-19 years adolescent students⁽⁸⁾, and Nepal (56.5% of male and 67.9% of female adolescents aged 15-19 years)¹¹ and higher than that reported in Lebanon, where about 1 in 10 private and public university students played sports once daily.¹⁵ Also, in Bangladesh, 38% of adults aged 25 years and more had low physical activity level (<600MET-minutes/week).¹⁴ Also the prevalence of physical inactivity was 41.4% and reached 80.6% in Pakistan; higher in females than males among 17,928 undergraduate university students aged 16-30 years in 23 low, middle and high-income countries. The highest rate was

found in Southeast Asian countries.¹⁷ WHO findings showed that fewer than 1 in every 4 adolescents globally meets the recommended guidelines for physical activity-60 minutes of moderate to vigorous physical activity daily.¹⁹

The results of this study found that inadequate fruits and vegetable intake among youth was 89.7%. In Bangladesh, 93% did not consume adequate fruit and vegetables (≥ 5 servings / day)⁽¹⁴⁾. In university students in 23 low, middle and high-income countries, inadequate fruits and vegetables intake (<5 servings/ day) was high (81.8%) and to some extent lower than this study.¹⁷ In Canada (COMPASS study) inadequate fruits and vegetable intake among school adolescent students was lower than that reported by our study 74.3%.¹⁶ In Brazil, consumption of fruits and vegetables ($<$ once a day) among 14-19 years' adolescents was higher than that reported by our study (51.4%)⁽⁸⁾. In Lebanon, very few students consumed fruits (19%), green salad (8.9%), cooked vegetables (3.4%) twice daily or more in the last 24 hours.¹⁵

Excess salt intake among youth in this study was 44.2%, this figure is higher than that was reported in Nepal, where 26.2% of adolescents aged 15 – 19 years were consuming large amount of salt per day (more than WHO recommendation).¹¹

Internet use ≥ 2 hours/ day in this study was 11.8% (higher in males and younger), lower than that reported in Lebanon by private and public university students who spent more than two hours / day for computer stay (50.4%).¹⁵ It is also lower than that was reported in Canada (COMPASS study), where internet use ≥ 2 hours / day among school adolescent students was 48.8%.¹⁶ In the (SYPE, 2010) conducted on 10 -29 years-old, internet use was not an everyday activity. Males used the internet about three times longer per day

(0.14 hour) than females.²⁰ This low use may be explained by still high illiteracy/read & write and even many youth did not complete mandatory basic education particularly among females and older youth, residing in rural areas and of lower wealth level.⁷ In this study, consumption of low-nutrient & energy-dense food which are associated with overweight/obesity (obesogenic behaviors) as excess soft drinks ≥ 4 times /week was 11.3%, excess sweet was 9.2%) and fast foods ≥ 4 times /week was 8.3%. It is lower than that was reported in Canada (COMPASS study) where dietary habits associated with overweight /obesity as excess beverage and sweet was 34.8%, fast foods ≥ 1 time per week was 67.5% among school adolescent students.¹⁶

The factors that shape patterns of behaviors such as social acceptance, religious values, culture, legislation and regulatory frameworks, may vary between different countries.

Combination of unhealthy behaviors: Engaging in multiple risk behaviors is associated with greater risk whether an additive or synergistic negative influence on chronic diseases and mortalities.²

As most of the existing evidence on the common NCD risk factors is based on analysis of a single factor at a time, there is a need to investigate the co-occurrence of the common NCD risk behaviors.²¹

In this study, 80% of youth (13 – 35 years) had two or more NCDs risk behaviors, 39.1% had three or more and on average 2.3 ± 1.1 (range: 0 – 9) and only 0.9% had none. By using logistic regression analysis for unhealthy behaviors of NCDs (2 – 9) according to demographic factors, it was observed that younger, male gender and those of middle and high wealth level are at lower risk of developing high (2-9) simultaneous NCDs risk behaviors.

In Southern Brazil⁹, only 6.5% of 3990 adolescents aged 14-15 years did not

display any of the four risk behaviors analyzed. In other study in Brazil, about 10% of 4217 adolescents of high-school students enrolled in public schools, (14-19 yrs old) were not exposed to health risk behaviors.⁸ The results of these studies were better than our results (0.9%).

In USA, a recent study of the prevalence of five health-related behaviors among 395,343 BRFSS (Behavioral Risk Factor Surveillance System) respondents aged 21 years or older, only 1.4% of respondents engaged in none of the 5 behaviors²² which is nearly similar to our results.

The very low prevalence of young people free from risk behaviors in this study (0.9%) may be explained by high number of studied risk behaviors and also high combination of unhealthy risk behaviors.

The combination of two or more NCDs risk behaviors in adolescent sample were 58.5% in Brazil.⁸ 48.2% in Southern Brazil⁹ and 24.3% in USA²² which were lower than that of our results (80%). The clustering continued to rise in adults to reach 52% in USA²³, 55% in the Netherlands²⁴, and 59% in Brazil²⁵ and increased markedly to reach 68% in England²⁶, and about 75% in Bangladesh.¹⁴ The combination of three or more NCDs risk behaviors were 12.4% in Southern Brazil⁹, 35.4% in USA²² and 38% in Bangladesh¹⁴ which is lower than our results (39.1%).

In this study, there was a difference between genders; females had 2 or even 3 combined risk behaviors higher than males. Also, two and more risk behaviors were higher in females (81.9%) than males (78.5%) (table 2) and by applying logistic regression analysis, male respondents were at lower risk of developing high²⁻⁹ simultaneous NCDs risk behaviors. Inadequate fruits & vegetable intake and physical inactivity were common combination (data not shown).

In Southern Brazil⁹, two and more risk behaviors were higher in females than males. Among males; smoking clustered with alcohol intake (very low in our study) and physical inactivity and among females; low fruit intake clustered with physical inactivity. In university students in 23 low, middle and high-income countries, low fruits & vegetables intake and physical inactivity were aggregated (40%) and higher in women than men.¹⁷ Older youth (81.1%) was associated with multiple unhealthy behaviors of NCDs²⁻⁹ compared to younger (78.6%) and this is supported by applying logistic regression analysis. This is consistent with other studies in Brazil^{8,9} and Bangladesh¹⁴ and low, middle and high-income countries.¹⁷ Clustering phenomenon in our sample was prominent with increasing age and female gender.

Conclusion and Recommendations:

The Egyptian youth are exposed to high single (with the exception of alcohol, and smoking among females) or simultaneous health risk behaviors particularly low fruit & vegetables intake and physical inactivity especially among females. Our findings suggest that Egypt could expect a significant increase in NCDs of the coming adult generations.

Clustering raises risk by more than a summation of risk behaviors which needs more elaboration in our community and further research is required to investigate the interrelationships of lifestyle risk behaviors.

Early integrating health promotion and multiple health behavior change interventions are needed before unhealthy habits become established to prevent accumulation of risk behaviors as youth mature and their future adverse health outcomes.

Creation of awareness and engagement of various stakeholders beyond health sector to encourage people to adopt

healthy behaviors with an enabling environment and to develop/implement an appropriate policies and programs. Strict implementation of WHO Framework Convention on Tobacco Control (FCTC) among men. Surveillances of health behaviors and NCDS on standard comparable indicators on regular basis should be established.

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