RESEARCH ARTICLE

CIGARETTE SMOKING AMONG SECONDARY SCHOOL STUDENTS IN MAURITIUS-A PILOT STUDY.

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Manuscript Info	Abstract
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In this work, we aimed to study the existence of any relationship between knowledge about health effects of Cigarette smoking and the intention to quit smoking among Mauritian secondary schools students. The objectives were to identify the prevalence of intention to quit smoking among current smokers, determine smokers' knowledge about health hazards of smoking and to assess the impact of knowledge about health risk of smoking on the intention to quit smoking. A survey was carried out by means of questionnaires which were distributed to the secondary school students. Statistical analysis was performed using SPSS, version 24. The findings of the study revealed that 85% of current smoker had an intention to quit smoking; it was also found that none of the smoker had complete awareness towards all the health effects of smoking assessed and a direct linear relationship between knowledge about health hazards of smoking and intention to quit smoking was noted (Pearson correlation coefficient, *r = 0.729*).

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Introduction:-

Cigarette smoking, the most popular way in which tobacco is generally consumed, is currently considered as a major public health problem world-wide and it is an important leading cause of preventable morbidity and premature mortality (Reda et al, 2012). Although, the prevalence of smoker in Mauritius has decreased by about 10% from 1998 to 2010 (ITC report, 2010), Cigarette smoking, is still affecting the Mauritian population at large, cutting across all age groups (ITC project, 2010). It is regrettable to note that in Mauritius, the age of initiation of smoking is relatively low, the most common age being 12- 13 years but some children started smoking as early as 7 years of age (National action plan, 2008-2012). Moreover, 15.1% of secondary school students are smokers (WHO, 2013) as well as 40% of youngsters aged between 15 and 25 years are consumers of the synthetic drugs in Mauritius (L'express, 2018).

Cigarette smoking poses numerous health risks to its users such as it increases the risk of several cancers, Chronic Respiratory Obstructive Disorders (COPD), strokes, heart diseases, infertility, rheumatoid arthritis among others (CDC, 2018); the effect is even worst when it used during adolescents, for instance, it has been found that teenagers who smoke are 3-22 times more likely to become consumers of other harder and illicit drugs (WHO, 2019) and it is also link to severe health and financial consequences in the long run (ERS, 2019).

Quitting smoking at a younger age has been paralleled to a significant reduction in the health risk associated with smoking (American Cancer Society, 2018) and to bring this behaviour change, knowledge about the health-risk of

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cigarette smoking is one of the pre-requisites (Becker MH, 1974). Furthermore, having the intention to quit smoking (ITQ) is central to intentional smoking cessation (Prochaska et al. 1998) as quitting smoking is not a single act but rather a process that goes through several stages as described by the trans-theoretical model of behaviour change (Prochaska et al, 1998).

In view of the above and the fact that adolescents being the most vulnerable segment of the population to risky behaviours, it is therefore highly recommended to promote smoking cessation campaigns targeting adolescents of Mauritius and since schooling is compulsory till the age of 15 years in Mauritius, schools, in particular secondary schools, can be used as a plat-form to deliver the various anti-tobacco smoking campaigns as adolescents spend maximum of their time in these educational institutions (National action plan, 2008-2012; NIDA, 2003).

Since there was no data pertaining to the intention to quit smoking and to the level of knowledge about the health-risk of cigarette smoking among smoker population of secondary school students in Mauritius, this study therefore aimed at filling the gap in the literature by assessing the knowledge about health effects of Cigarette smoking and the intention to quit smoking among Mauritian secondary schools students.

The main objectives of the study were to:
1. To assess the prevalence of intention to quit cigarette smoking among smoker population of secondary school students in Mauritius.
2. To determine smokers' knowledge about smoking health risks.
3. To determine the association between quitting intention (stages) and smokers' knowledge about health risk of cigarette smoking.

Smoker refers to secondary school students that are current smokers; Current smoker status is defined as having smoked, even a single puff of cigarette in the past 30 days (GYTS indicator definition, 2014).

Methodology:-
Research approach:
A quantitative research method was used. It makes use of statistical data as a tool for saving time and resources.

Research design:
A cross-sectional study was done as it is a relatively quick, inexpensive and feasible method. Since, the method involves a snap shot, there is no loss of participants due to follow-up (Sarantakos 2013).

Target population:
Current cigarette smoker among secondary school students of a mixed private secondary school of Port-Louis, Capital of Mauritius.

Inclusion criteria:
1. Secondary schools student who are current smokers, age between 11-20 years.
2. Secondary schools students (current smoker) that are of Mauritian origin.
3. Both genders are included in the study.

Exclusion criteria:
1. Secondary schools students (current smoker) age less than 11 years and more 20 years old.
2. Secondary schools students (current smoker) who are not of Mauritian origin.
3. Students (current smoker) whose parents have not given consent.
4. Students that were absent on the day the questionnaire was distributed.

Sample & Sampling
Twenty (20) participants (current smokers) have been recruited through convenience sampling method from a private mixed secondary school located in Port-Louis (capital of Mauritius). A private secondary school was chosen as it was easier to get access; Approval and permission was obtained from the principal of the chosen institution. Moreover, a mixed school was used to make the study gender sensitive.

Data collection tool:
A Standardised self- administered questionnaire was used.

The questionnaire consisted of three main parts: cover letter, instructions and the main body.
The body of the questionnaire is adapted from Global Youth Tobacco Survey (GYTS) Core Questionnaire, Xianglong Xu et al (2015) and from Dawood et al (2018).

It consists of three parts: (1) Questions on background of the student. (2) Questions to determine the prevalence and stage of "intention to quit smoking. (3) Questions to determine smokers' knowledge about smoking health effects.

Questions on background of the student were taken from "background information about yourself" from the Global Youth Tobacco Survey (GYTS) Core Questionnaire.

The prevalence and stage of "intention to quit smoking" was assessed using validated standardised questionnaire adapted from Dawood et al (2016): "Knowledge and perception about health risks of cigarette smoking among Iraqi smokers." The prevalence of quitting intention was assessed by the following questions: "Are you planning to quit smoking." Yes/no. For those respondents who have an intention to quit smoking, the stage of quitting intention was assessed by the following questions: when are you planning to quit smoking: "within the next month," (score of 3), "within the next 6 months (score of 2)," and "sometimes in the future, beyond 6 months" (score of 1). For respondents who do not have an intention to quit smoking, a score of 0 (no intention) was given. The range of score for quitting intention score was 0–3, where highest score represents the high level of intention to quit (corresponding preparatory stage of trans-theoretical model of behaviour change).

The rationale behind the above was that we were identifying the stage of behaviour change in respect to intention to quit smoking according to the transtheoretical model of behaviour change. For purpose of this study, we assessed the precontemplation, contemplation and preparatory stage only. According to the said model, a smoker who was not ready to quit in the next 6 months was in the precontemplation phase, contemplation phase was one where the individual considered quitting within the next 6 months while in the preparatory phase, the smoker planned to quit in the following one month (Velicer 2001; Charkazi et al. 2012).

The knowledge about smoking health effects was assessed using validated standardised questionnaire adapted from Xianglong Xu et al (2015): "Smoking-Related Knowledge, Attitudes, Behaviors, Smoking Cessation Idea and Education Level among Young Adult Male Smokers in Chongqing, China"

Five health outcomes of direct smoking (lung disease, oral cancer, heart disease, stroke and impotence in male smokers) and five health outcomes of second hand smoke (lung cancer in non-smoker, lung disease in children, Pregnant ladies who have been exposed to passive smoking are likely to have low birth weight babies and Smoking causes serious harm to one's health) were used to determine the level of knowledge about the health effect of smoking. Responses were coded as "yes" =1, no/don't know = 0. The range of knowledge score was 0–10, where high score represented the high level of knowledge.

Data analysis
SPSS 24 was used. Descriptive statistics and correlation analysis was performed for data analysis

Findings
From this study it was found that 85% of current smoker had an intention to quit smoking whereby 88.2% male smoker and 66.7% female smoker had a positive intention of quitting smoking. Moreover, out of the 17 participants who had an intention to quit smoking, two were in the pre-contemplation stage, another two were in the contemplation stage and the rest (13 participants) were in the preparatory stage of quitting.

	Intention to quit smoking	No intention to quit smoking	Total
Male smokers	15	2	17
Female smokers	2	1	3
Total number of smokers	17	3	20

Table I:-Gender-based distribution of smokers and their smoking quitting intention.
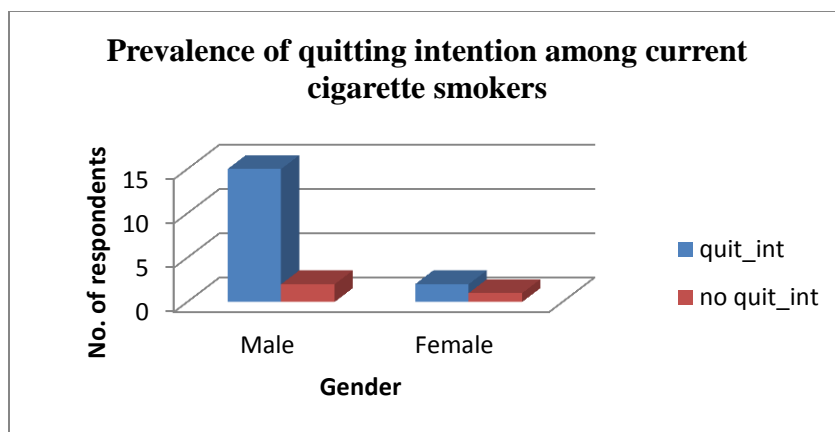
Table II:-Gender-based comparison of smoking quitting intention among current smoker
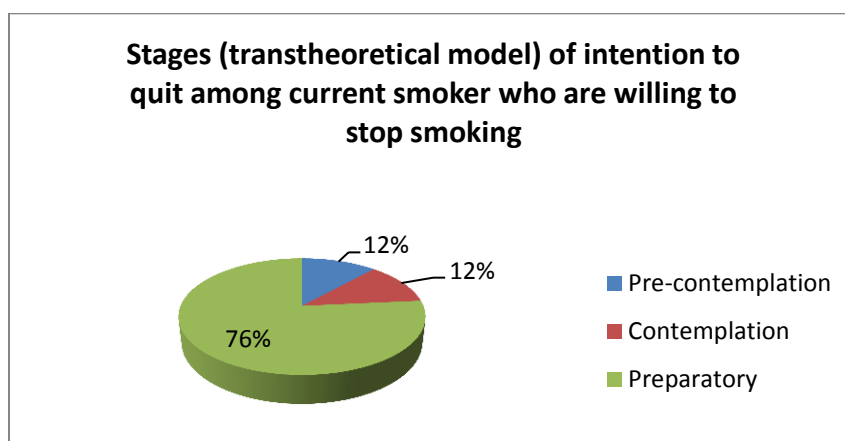

Table III:-Distribution of smoker based on their stages of intention to quit-smoking

While assessing the health risk of cigarette smoking, we found that no smoker had complete awareness towards all the health hazards of smoking assessed. However, the knowledge score was high for lung cancer (95%), oral cancer (85.5%), and stroke (85.5%); and low knowledge score for impotence in the male smokers (20%), lung cancer in non-smokers (55%) and birth of low birth weight babies in pregnant lady exposed to passive smoking (50%).

	Assessment of knowledge questions	No of respondents who are aware	No of respondents who are not aware
1.	Does smoking causes lung disease?	19	1
2.	People who smoke cigarette are more likely to suffer from oral (mouth) cancer	18	2
3.	Smoking causes heart disease.	18	2
4.	Smoking can cause stroke (attacks/paralysis)	12	8
5.	Smoking causes impotence in male.	4	16
6.	Passive smoking causes serious harm to one's health	16	4
7.	Passive smoking causes Lung cancer in non-smoker	11	9
8.	Passive smoking causes Lung disease in children	14	6
9.	Passive smoking causes heart disease	16	4
10.	Pregnant ladies who have been exposed to passive smoking are likely to have low birth weight babies	10	10

Table IV:-distribution of level of awareness of current smokers pertaining to health hazards of cigarette smoking
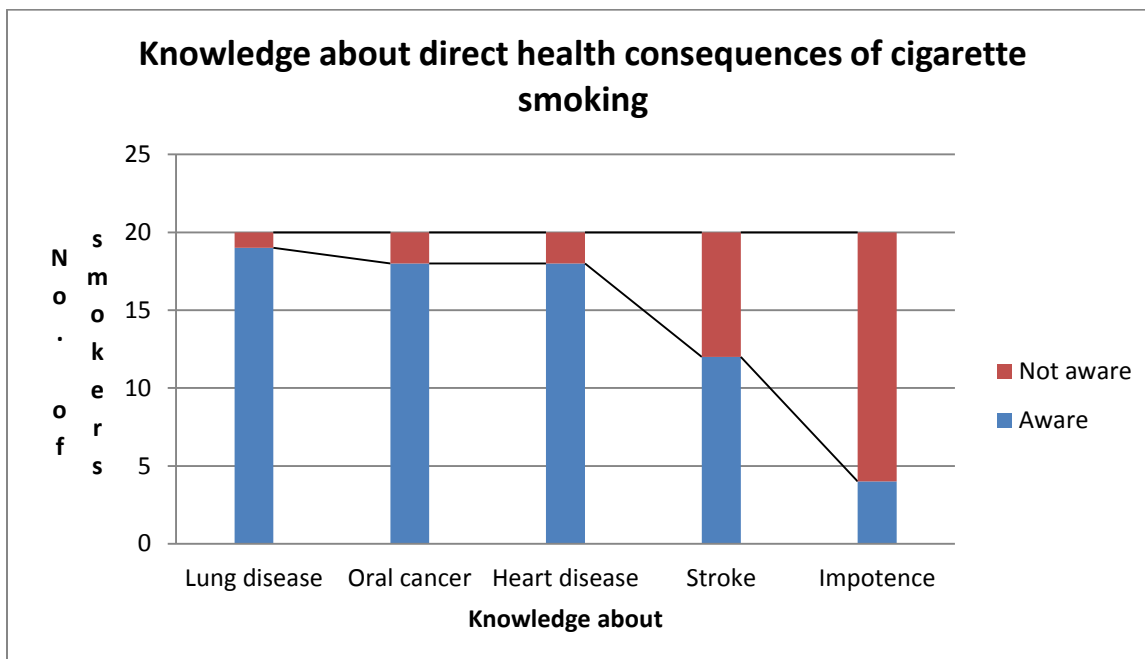
Table V:-Distribution of level of awareness of current smokers pertaining to direct health hazards of cigarette smoking
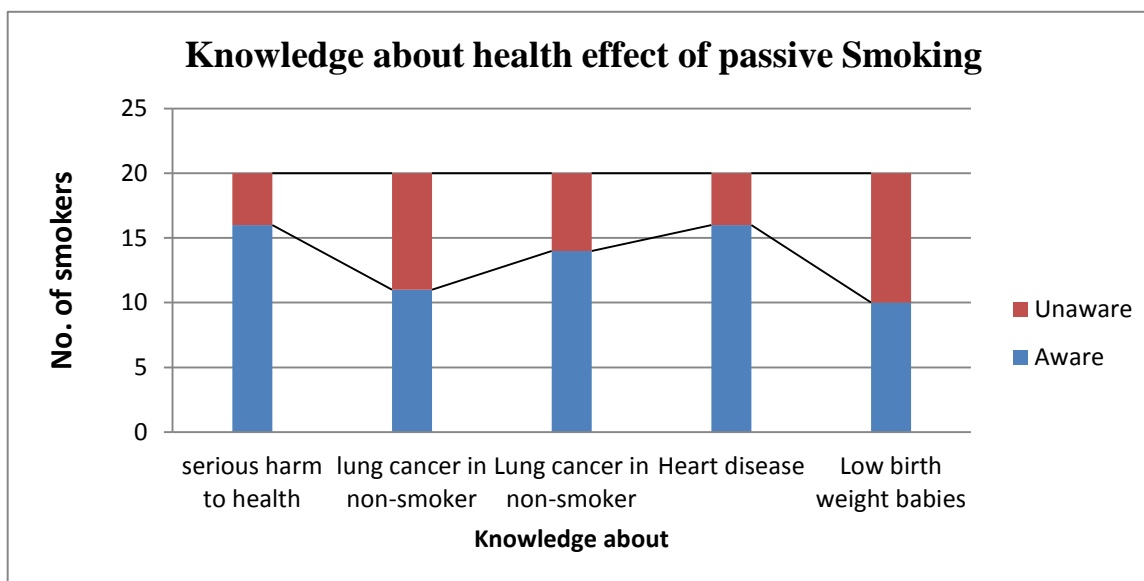

Table VI:-Distribution of level of awareness of current smokers pertaining to health hazards of passive cigarette smoking

When a correlation analysis was done between level of knowledge and quitting intention, the Pearson Correlation coefficient, *r,* was found to be 0.729, which showed that there was a large positive strength of association between the two variables- the level of knowledge pertaining to health-risk of cigarette smoking and intention to quit smoking.

		Intention to quit score	knowledge score
Intention to quit score	Pearson Correlation	1	.729[**]
	Sig. (2-tailed)		.000
	N	20	20
knowledge score	Pearson Correlation	.729[**]	1
	Sig. (2-tailed)	.000	
	N	20	20
**. Correlation is significant at the 0.01 level (2-tailed).			
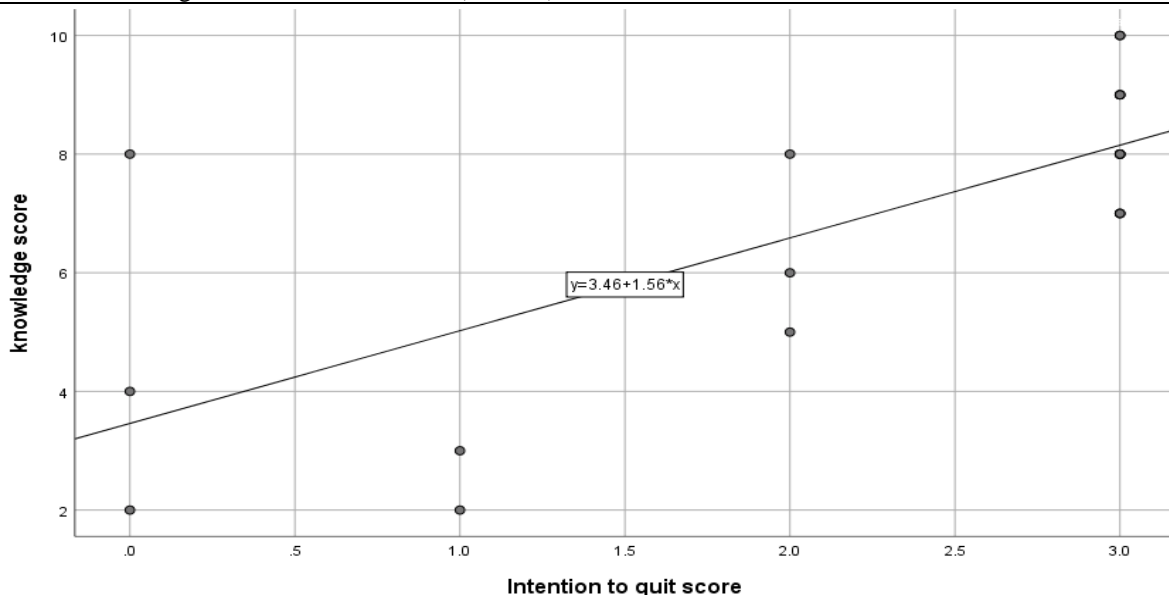
Table VII:-showing relationship between knowledge score and intention to quit smoking.

Discussion:-
In this secondary school cohort, we found that 85% of smokers expressed their intention to quit smoking. A study among Intermediate and Secondary School Students in Saudi Arabia found that 71.7% of participants had the intention to quit smoking and Intention To Quit, ITQ, was significantly associated with male gender (Al-Zalabani et al. 2015). Similarly, studies in Hong Kong, found that about 51% of the students who smoke had an intention to quit smoking where male students were again more likely to have a quitting intention as opposed to female students (David C.N. Wong et al. 2010) and in UK, only 43% of regular smokers aged 11-15 year reported an intention to quit smoking (Amos et al, 2009). Thus, the level of interest in quitting smoking of the respondents in secondary school of Mauritius was higher compared to that in Saudi Arabia, Hong-Kong and much higher than respondents of developed countries such as England and other countries. But nevertheless, more effort is needed to help the youngsters of Mauritius to quit smoking. Our study also shows that secondary school male smokers are more likely to quit smoking which is consistent with studies performed in Saudi Arabia and Hong Kong.

Despite several media campaign done on television, radio, bill-boards and box of cigarettes to sensitise the population of Mauritius towards the ill-effect of cigarette, we found that the awareness level is relatively low for certain health risks such as "smoking causes impotence." This shows that our awareness campaign is not very impactful. Moreover, in this study we also found that none of the participants had 100% awareness towards the ten health-risks of cigarette smoking assessed which shows that increase effort is needed to increase the knowledge and sensitize this group of the population for the benefit of smoking cessation.

Studies in Nigeria, China, Iraq, Greece and Poland have shown a positive correlation between knowledge and intention to quit smoking. From this study, a Pearson correlation coefficient of r =0.729 is obtained when correlation analysis is done between knowledge score and intention to quit score which shows that there is a strong positive linear association between these two variables. Our study about the correlation analysis is therefore in line with similar type of studies performed in the above-named countries.

Limitation of the study
The result of this study cannot be generalised to the whole adolescents population of Mauritius since the sample size was very small and not representative of the population such that further research is needed in order to have a finding which is representative of the adolescent smoker population of Mauritius. Moreover, since, a cross-sectional study design was used; it is not possible to make a causal inference.

Recommendation
Following the research based on the knowledge about the health risk of cigarette smoking and the intention to quit smoking among secondary school students of Mauritius, the following major recommendation emanates:

Reinforcement of awareness campaign
Awareness campaign on the health-risk of cigarette smoking need to be reinforced in Mauritius. A lack of knowledge pertaining to health risk of smoking has been found to be a barrier to the intention to quit smoking.

School-based activities targeting the different level of prevention of smoking need to be provided.
1. Tobacco education can be made as an examinable subjects as part of school curriculum as drug education has been found as one of the most important measures to fight against this battle (UNODC 2004). Moreover, subjects that are examinable are taken more seriously and in this case may result in better outcome in the future as the students will at least gain knowledge about drugs such as tobacco (Alex 2017; UNESCO 1994).
2. Training about social resistance skills also can be promoted in view to prevent youngsters to fall into the trap of cigarette smoking such that they can recognize situation where they can be victim of peer pressure for smoking and thus know how to respond most effectively to such circumstances.

Health clubs and essay competition pertaining to the dangers of smoking can be promoted among youngsters.

These intervention need to be initiated at a reasonable age where it is early enough to prevent risky behaviours (Chowdry et al. 2013). We propose the age of initiation to be 9-10 years as it corresponds to the age of pubertal changes. It has been noted that there is increased risk of indulging into risky behaviours at every transition from early childhood through young adulthood (NIDA, 2003).

Promote research
Since a significant proportion of school students who smoke have an intention to quit smoking, research has to be done to identify factors that are preventing them from quitting, such that the most appropriate measures can be taken to help them achieve this goal.

Secondary school students who smoke need to be given the necessary support to quit smoking at school places.
It is important that teenagers who smoke be given special consideration in terms of dedicated time and psychological support to benefit from smoking cessation strategies by specialized resource persons such as psychologists. Teachers at school also need to be given special training about how to handle and help these students. A supportive environment that enables the students to quit cigarette smoking is needed at school. Thus, a holistic approach to facilitate smoking cessation has to be implemented on secondary school premises.

Implement measures to decrease stigma towards students who smoke cigarette
It has been shown by different studies that stigma prevent and discourage access to health services (Substance Use Prevention and Harm Reduction Guideline, 2018; UNAIDS, 2016). Thus decreasing stigma can improve care and ultimately in the long-term can decrease the health and economic impact associated with cigarette smoking (Livingston et al, 2012). However, such types of measures are debatable as it can be thought as encouraging teenagers to smoke.

Peer training and peer-led intervention can be encouraged.
Peers can access young boys and girls that are hard to reach. Peer-led intervention has been successful in preventing tobacco use (MacArthur et. al., 2016).

Implementation of Behaviour change and behavior therapy as part of primary prevention need to be promoted
Behaviour change is a pre-requisite to fight against the war against illicit drug use in the youth (Wakefield et al., 2010). Different types of behavioural therapy including cognitive behavioural therapy, contingency management intervention, motivational incentives, motivational enhancement therapy and family behaviour therapy will be implemented mainly though primary prevention measures.

Promote awareness about the seven tobacco cessations clinics available over the island and the type of treatments provided such as nicotine replacement therapy, bupropion therapy and behavioural therapy.

Multi-sectoral Strategies for effective prevention of cigarette smoking and smoking cessation services need to be enhanced through:
Reinforcement of awareness about the consequences of cigarette smoking through media campaigns, implemention of Family based intervention (NIDA, 2003; Bauman et al. 2001), helping the students who smoke to know the types of treatment available and how to access them in order to help them quit smoking, promotion of sport and leisure activities, reinforcement of laws towards people who sells cigarette to minors among other strategies.

Conclusion:-
In conclusion, the findings from this study support the idea that smokers of secondary schools can be seen as a population ripe for addressing tobacco cessation as majority of the current smokers have an intention to quit smoking in the near future. Cigarette smoking is a preventable problem and current investment in appropriate prevention programs will be cost-effective in the future. However, if suitable measures are not taken, the future of our youth and the country will be blurred as tobacco smoking has several devastating impacts on the health of its consumers, surroundings as well as on the economy of the country. In an attempt to control this problem, a well-coordinated, integrated, multi-dimensional, multi-sectoral and a life-course approach is needed whereby the public sectors, private sectors, national and international NGOs and stakeholders have to work together to promote the most effective universal and high risk preventive approach in addition to law enforcement strategies.

Ethical consideration
Permission was taken from the owner and head of the chosen institution and informed consent was taken from the responsible party of the students selected for this study. All data has been treated with strict anonymity and confidentiality.

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Conflict of interest:
The authors have no conflict of interest to declare

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