

## **Knowledge and prevalence of sexually transmitted infections among tertiary students in Madang, Papua New Guinea**

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### **Abstract**

This cross-sectional study examined the knowledge and prevalence of sexually transmitted infection (STI) among 693 first year students of five tertiary institutions in the Madang Province of Papua New Guinea. Data were collected using a researcher-made group administered questionnaire. The results revealed that the overwhelming majority of the students rated their knowledge of STI as 'poor'. Out of 693 respondents only 11 students reported to have been treated for STI. However most of the students thought that STI was more widespread among students but people were ashamed to reveal it or to seek medical assistance. Approximately 35% of the respondents claimed to have never had any education or instruction on STI. In the light of this study we recommend a clinical study on STI as well as more educational programs on STI for tertiary students across the country.

**Key words:** sexually transmitted infection, venereal disease, tertiary students

### **Introduction**

Sexually transmitted infection (STI) is an illness that has a significant probability of transmission between humans or animals. Transmission occurs by means of sexual contact, including vaginal intercourse, oral sex and anal sex. The term STI has been used in recent years due to the fact that a person infected with the virus or bacteria will not show any sign of disease, or that the persons' body is being invaded. Disease is a term that refers to infection that causes the person to feel that something is wrong with the body (Wikipedia Encyclopedia, 2009). The older terminology of 'venereal diseases' has been superseded in the past 50 years by 'sexually transmitted diseases' and more recently by 'sexually transmitted infections'. The term 'sexually transmitted diseases' incorporated newly discovered sexually transmitted agents and syndromes more easily than 'venereal diseases'. Nowadays, the term STI is preferred, since it covers all the diseases that can be transmitted by sexual intercourse. However, for all practical purposes, both STI and STD terms are used synonymously (Thappa & Kaimal, 2007, pp.78-82).

STIs are more dynamic than other diseases prevailing in the community. Their epidemiological profile varies from country to country and from one region to another within a country, depending upon ethnographic, demographic, socio-economic and health factors (Thappa & Kaimal, 2007, p.82).

## **Global trend**

The global burden of sexually-transmitted infections to health and development is often overlooked as a public health priority. STIs are commonly caused by bacteria, viruses and protozoa, such as syphilis, gonorrhoea, Chlamydia, genital herpes, genital warts, hepatitis B virus, human immunodeficiency virus, and trichomoniasis.

Despite diagnostic and therapeutic advances that can be used with patients with STIs, the incidence rates of STI remain very high in the world at large (Wikipedia Encyclopedia, 2009). The World Health Organization (WHO) estimated that 333 million curable STIs occur each year with more than two thirds occurring in the developing world (Dehne & Riedner, 2005). In 1996, WHO estimated that more than one million people were being infected daily with STI. About 60% of these infections occur in young people less than 25 years of age and, of these, 30% are above 20 years of age. Between the ages of 14 and 19, STIs occur more frequently in girls than in boys by a ratio of nearly 2:1; this equalizes by age 20. An estimated 340 million new cases of syphilis, gonorrhoea, Chlamydia and trichomoniasis occurred throughout the world in 1999 (WHO, 2003).

According to a Wellcome Trust report (2003), the highest prevalence rates (i.e., population-based burden) of curable STIs occurred in the sub-Saharan African nations with 20%, Latin America and the Caribbean with 11%, and South and Southeast Asia with 44%. Thus, the largest number of curable STIs occurred in Asian nations. Due to their high prevalence in developing countries, STIs result in substantial productivity losses for individuals and communities, particularly where the majority of the population is less than 40 years of age. In developing countries, STIs are among the leading causes of 'disability adjusted life years' lost for women of reproductive age, exceeded only by maternal causes and HIV. Cervical cancer, caused by the hepatitis B virus, is the largest single cause of years of life lost to cancer in the developing world and, because it affects women in their most productive years, has a devastating effect on the well-being of families. Syphilis among pregnant women still results in up to 1.5 million prenatal deaths each year. Damage to the fallopian tubes from gonorrhoea and Chlamydia can lead to infertility, as well as tubal pregnancy, an important cause of maternal death in developing countries (US Center for Disease Control and Prevention).

## **STI in Papua New Guinea**

Papua New Guinea has experienced three epidemic waves of STIs since written medical records were first kept. According to Riley (2000), the first case of STI was identified by Europeans towards the end of the nineteenth century. It was one of the most disastrous outcomes of the labour trade and comprised principally gonorrhoea and granuloma inguinale, although other infections may have been involved. The second case was of syphilis identified in 1969. It

appears to have been consequent upon the eradication of yaws. The third case was of HIV and AIDS, the first case of AIDS being diagnosed in 1987.

A survey in Port Moresby in 1992 among women attending antenatal clinics found a prevalence of 3.4% for syphilis and 17.7% for Chlamydia. Also a 1995 study conducted among adult men and women in rural settings found a very high prevalence of Chlamydia (26.4%) and trichomoniasis (46.5%) (WHO, 1999). Another research study conducted by the PNG Medical Institute in 1995 among rural women from ages 15-45 years revealed 31% Chlamydia, 4% syphilis, 15% gonorrhoea, 46% trichomoniasis and 14% pelvic inflammatory disease (*A Manual for Health Workers*, 2006).

According to the WHO (2003), statistics on sexually transmitted infections in Papua New Guinea show a high prevalence among both high risk and low risk groups. The prevalence of gonorrhoea was 15% among Highland populations and 36% among sex workers. Chlamydia prevalence was up to 26% in Highland populations and 31% in sex workers. The prevalence of syphilis was 4% in the Highland populations and 32% in sex workers. Trichomoniasis was found in 45%-50% of both the low risk and high risk populations. Additionally, vaginal discharge is a common problem for women in PNG (Riley, 2000). Furthermore, the rates of gonorrhoea, syphilis and Chlamydia have remained high in the last two decades in PNG (Gare et al., 2005).

#### **Studies related to STI in tertiary institutions**

A number of studies are reported on sexually transmitted infections in tertiary institutions especially in African countries, mainly Ghana and Nigeria. They include comparative studies of STI among primary school and tertiary students (Obiajuru & Jude, 2007), case studies and retrospective studies (Fatiregun & Bamgboye, 2004) and epidemiological studies, mostly using questionnaires, interviews and group discussions (Ibe, 2005) for data collection and in some cases through special treatment clinics.

In Nigerian tertiary institutions, a retrospective review of records was carried out of all new patients presenting at the special treatment clinics between 1st January 2000 and 31st December 2000 (Fatiregun and Bamgboye, 2004). Records were available for 336 new patients who visited the clinic in the year under review. The result showed that non-gonococcal urethritis (45.2 %) and gonococcal urethritis (15.9%) were the most common STIs in men, while candidiasis (37.2%) and gardenerella vaginitis (31.8%) were the most common in women.

A comparative study of the prevalence of sexually transmitted infections among post-primary and tertiary school students in Imo state Nigeria was carried out from January to December 2002 (Obiajuru & Jude, 2007). The findings showed that out of 2,654 post-primary school students aged 11–25 years, 371 (13.98%) were infected with STIs – primarily with gonorrhoea, trichomoniasis, syphilis, HIV, genital Chlamydia and candidiasis, while 629

(17.16%) out of 3,666 tertiary school students aged 16–40 years, were infected with the same group of STIs.

In Papua New Guinea, no STI research study has focussed on students in tertiary institutions, however, some studies were conducted among sex workers (Gare, et al., 2005) and among rural women especially in the highlands (Passay, et al., 1998). These studies have shown that sexually transmitted infections cause considerable morbidity and suffering among women of reproductive age and children and, as such, constitute a significant challenge to public health. The rates of gonorrhoea, syphilis, and Chlamydia have remained high in the last two decades in PNG. Among selected, presumably low-risk groups, estimated rates in the range of 18% to 80% for gonorrhoea, 4% to 30% for syphilis, and 17% to 44% for Chlamydia have been reported, and similar rates have also been noted for trichomoniasis and bacterial vaginosis (Gare, et al., 2005).

Through the Goroka sex workers peer-mediated program, studies among female sex workers were conducted by inviting self-identified sex workers to participate. All consenting female sex workers underwent pre-test counselling and provided socio-demographic and behavioural data using a structured questionnaire. The women were asked to self-collect vaginal specimens and to provide peripheral blood to detect the respective STIs and HIV (Gare, et al., 2005). Results were available for 211 female sex workers. The overall estimated rates were Chlamydia 19%, gonorrhoea 21%, syphilis 24%, and trichomoniasis 51%. Seventy-four percent were positive for at least one STI and 43% had multiple STI infections. High-risk sexual behaviours were found to be common among the women, including low and inconsistent use of condoms, with most of them attributing this to unavailability, dislike by or familiarity with clients, and being drunk and/or high on marijuana.

A study among rural women in the highlands of PNG community based random cluster sample of women of reproductive age were interviewed and examined and had specimens collected for laboratory confirmation of chlamydial and trichomonal infection, gonorrhoea, syphilis, and bacterial vaginosis (Passy, Mgone, Lupiwa, Suve, Tiwara, Lupiwa, Clegg, & Alpers, 1998). The laboratory results confirmed the clinical impression of an extremely high prevalence of STIs in this population. From 201 women, trichomonas vaginalis was detected in 46%, Chlamydia trachomatis in 26%, pelvic inflammatory disease (diagnosed clinically) in 14%, bacterial vaginosis in 9%, syphilis in 4%, and neisseria gonorrhoeae in 1%. Fifty-nine per cent of the women had at least one STI (Passay et al., 1998).

Another research study of all cases of congenitally acquired syphilis diagnosed at Goroka Base Hospital was conducted between January 1998 and December 1999. Sixty-seven affected neonates and children were identified with congenital syphilis, of whom nineteen died during the first admission and three died during the period of follow-up. Congenital syphilis caused 5.5% of 994 neonatal admissions, but 22% of all neonatal deaths. During the time of the study 5385 women attended antenatal care at Goroka Base Hospital, of whom

382 had both positive Venereal Disease Research Laboratories and Treponema Pallidum Haemagglutination tests. The incidence of syphilis in women attending antenatal care was 7.1% (Frank & Duke, 2000).

A study was conducted in a rural and periurban community of the Asaro Valley near Goroka in the Eastern Highlands Province (Lupiwa, Suve, Horton, & Passay, 1996). This study was carried out through community health education, and the result revealed that most women had little knowledge about STIs. Even the major signs and symptoms that were experienced by many of these women were often thought to be normal and many women had not sought treatment until irreversible damage was done. Knowledge of the complications of STIs, such as infertility and stillbirth, was also very low among these women. It is apparent that there is a desperate need for more reproductive health education at the community level (Lupiwa et al., 1996).

According to Ibe (2005), STI in Papua New Guinea is increasing at an alarming rate; therefore, there is urgent need for more education, counselling and testing for STI in order to prevent the spread of STI due to ignorance and risky behaviours. Although a number of studies have been conducted on STI in PNG, no studies have been conducted in tertiary institutions from which come the nation's educated future leaders. Therefore, this study was considered important to gain information on STI understanding among tertiary students in PNG.

### **Objectives of the study**

This study aimed to achieve four goals, to:

- (a) explore the level of knowledge of STI among the first year tertiary students
- (b) examine whether there is a difference in the level of knowledge based on gender, age and the institution in which they were studying
- (c) find the prevalence rate STI among the tertiary students in this study
- (d) discover if they had attended any STI health awareness courses.

### **Significance of the study**

The results from this study can help to review policies on STI and to update the statistics of STI in the Health Department. The findings can inform educators to incorporate STI programs as part of the tertiary education curriculum.

### **Research design**

The study was designed as a cross-sectional study to explore the knowledge and prevalence of sexually transmitted infections among first year students at five tertiary institutions in the Madang Province, Papua New Guinea. The institutions included a university, teachers college, nursing college, technical college and maritime college. The total sample consisted of 693 first year tertiary students with approximately equal numbers of males and females. Participant ages ranged from 18 years to 24 years (mean age 21 years).

The main instrument of data collection was through a researcher-made questionnaire. It was a 24-item self-report measure of personal view and understanding of STI. Nineteen questions were regarding student knowledge on STI, prevalence of STI among the students, and demographic information without any sensitive questions. The first set of eleven questions was to determine the level of understanding through brief description of common STIs. It also included questions on STI identification; questions such as ‘Have you ever been treated for STI?’, ‘Have you had attended any awareness/classes/lectures on STI?’, and some general knowledge questions on STI infections.

The level of understanding was divided into three categories; ‘very good’ with a score of 8-11; ‘good’ a score of 4-7; and ‘poor’ a score of 0-3. Another three sets of questions were used to measure the type of treatment taken, type of infection through the description in the first set of questions, as well as the period of time when the student had attended some form of formal awareness on STI. The last set of 10 items was based on students’ general knowledge of STI. Each item was scored on a 1 to 5 Likert scale ranging from ‘strongly agree’ to ‘no idea’.

Prior to the survey, a pilot test was conducted to discover ambiguities, problems in questionnaire wording, misinterpretation of questions and so on. The participants of the pilot test consisted of three lecturers and 20 second year students within the university. Letters of approval to conduct the study were obtained from the heads of selected tertiary institutions.

The data on STI statistics was coded and analyzed using the SPSS 15 software. We primarily utilized frequency distribution and cross tabulations to look the level of general knowledge and understanding of STI in relation to some demographic variables. The processed data was then interpreted and presented in tables and graphs.

## Results

**Table 1: Gender of participants by institution**

<b>Tertiary Institution</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
University	123 (37%)	153 (46%)	276 (41%)
Teachers College	162 (48%)	125 (37%)	287 (43%)
Technical College	36 (11)	47 (14%)	83 (12%)
Nursing College	4 (1%)	11 (3%)	15 (2%)
Maritime College	12 (4%)	0 (0%)	12 (2%)
Total	337 (100%)	336 (100%)	673 (100%)

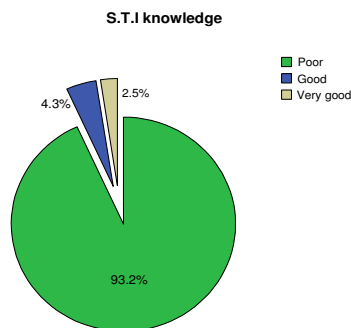
Missing = 20 of 693

**Table 2: Provincial affiliations of participants**

Province	Male	Female	Total
Central	6	16	22
Gulf	3	8	11
Milne Bay	8	11	19
Western	5	3	8
Oro	1	5	6
Morobe	23	15	38
Madang	89	58	147
East Sepik	30	42	72
West Sepik	12	13	25
Eastern Highlands	15	21	36
Simbu	19	15	34
Western Highlands	24	20	44
Enga	9	12	21
Southern Highlands	23	18	41
Manus	13	13	26
West New Britain	5	4	9
East New Britain	14	19	33
New Ireland	10	11	21
Bougainville	14	12	26
Jiwaka	3	0	3
Mixed parentage	3	16	19
other countries	2	1	3
Total	331	334	665

**Level of knowledge of STI**

The graph in figure one depicts a very clear image that the overwhelming majority of respondents (93.2%) rated their knowledge of STI as ‘poor’. Only 2.5% rated their knowledge as ‘very good’.



**Figure 1. Level of students' knowledge on STI**

The students were asked to rate whether they agreed or disagreed with a number of statements concerning STI. The results are shown in Table 3 as percentages. Some strong results were: (1) 80% of the respondents agreed or strongly agreed that there needs to be a lot more awareness of STIs; (2) 77% of the respondents agreed or strongly agreed that many people may have an STI but would be ashamed to admit it or seek medical attention; (3) 77% of the respondents agreed or strongly agreed that STI can seriously damage the reproductive system; (4) two thirds of the respondent group knew that STI was not spread through the air; and (5) two thirds of the respondent group recognised STI as a serious health issue in PNG.

**Table 3: Tertiary students' general knowledge on sexually transmitted infections in percentage**

Statements/items	SA	A	DA	SDA	NI
STI is same as AIDS	9	23	27	12	11
STI is not a serious health issue in PNG	8	7	25	41	4
Some STI can seriously damage reproductive system	58	19	1	2	4
There needs to be a lot more awareness on STIs	62	18	1	2	1
STI is a viral infection that spread through the air	1	2	21	44	16
STI infection can be known only through blood test	12	19	26	9	17
Women are more vulnerable to STI than men.	14	18	16	10	24
Some STI could spread through sharing of clothes	4	13	21	20	25
People infected with STI die quickly	3	14	31	11	25
Many people have STI but they are ashamed to seek medication	56	21	1	1	5

SA = strongly agree; A = agree; DA = disagree; SDA = strongly disagree; NI= no idea.  
N= 693, Missing data n=17

#### **Difference in the level of knowledge on the basis of gender, age, and institution**

When comparing the level of knowledge on the basis of gender, the results revealed that there was no significant difference ( $\chi^2=0.75$ ) between the male and female respondents. Table 4 shows the knowledge of STI according to the gender. There are only 7 male and 10 female students with 'very good' knowledge on STI and 14 male and 15 female students with 'good' knowledge on STI. The overwhelming majority of respondents (93%) rated their knowledge as 'poor'.

**Table 4. Student respondents' rating of level of STI knowledge**

Gender	Very Good	Good	Poor	Total
Male	7	14	316	337
Female	10	15	313	338
Total	17	29	629	675



We also looked at the difference in the level of knowledge by the ages of the respondents. For the analysis, the ages of the respondents were put into two categories: category one consisted of 534 respondents who were 16-23 years of age, and category two consisted of 118 respondents who were 24-48 years of age. A cross tabulation analysis showed that there was a significant difference ( $\chi^2=0.05$ ) in the level of knowledge of respondents between category one and category two with older respondents being more knowledgeable about STIs than younger respondents.

A cross tabulation analysis on the basis of institutions attended by respondents showed that there is a highly significant difference ( $\chi^2=.000$ ) on the level of knowledge between the five tertiary institutions. Further analysis revealed that the teachers college students had the best level of knowledge about STIs followed by the Maritime college, then the university, the technical college and lastly the nursing college.

### **Prevalence of STI among the first year tertiary students**

Thirty four students reported that they were infected with an STI at the time the data were collected. The most common reported cases were pubic lice, syphilis, pelvic inflammatory disease, gonorrhoea, Chlamydia and gardenerella. Trichomoniasis, donovanosis, thrush (candida), genital herpes, and genital warts each had one case reported. The clear majority of respondents reported that they had no STI.

**Table 5: Prevalence of STI among the first year tertiary students**

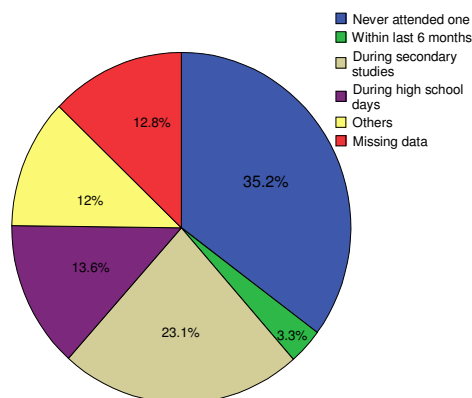
<b>Sexually Transmitted Infection</b>	<b>No.</b>	<b>%</b>
Pubic lice	9	1.3
Syphilis	5	0.8
Pelvic inflammatory disease	5	0.8
Gonorrhea	5	0.8
Chlamydia	3	0.4
Gardenerella	2	0.3
Trichomoniasis	1	0.1
Donovanosis	1	0.1
Thrush (candida)	1	0.1
Genital herpes	1	0.1
Genital warts	1	0.1
Total	34	4.9
No infection	642	92.6
Missing data	17	2.5
	693	100

### **Means of education and treatment of STI**

The respondents were asked if they had ever been treated for a sexually transmitted infection. The majority (86.4%) stated that they had never been

treated for a STI. About 1.6% of the students had received treatment for a STI; some (0.3%) within the last six months, some (1%) more than six months ago, and some (0.3%) more than a year ago.

The respondents were asked if they had ever attended an information or educational session specifically about STIs. The results are shown in Figure 2. Around 35% of the respondents claimed to have never attended any awareness or health education class on STI; 23.1% reported to have attended at least one session or talk during their secondary schools days and 13.6% during their high school days; 3.3% of the respondents attended one within the last 6 months; 12% have attained health education on STI through other forms of awareness in their own time; and 12.8% did not respond to this question.



**Figure 2: Percentage of respondents who have attended lectures, classes, seminars on STI**

### Discussion

The discussion on the findings of this study follows this outline: (a) level of knowledge of STI; (b) difference in the level of knowledge on the basis of gender, age and institution; (c) prevalence of STI; and (d) the means of education and treatment of STI.

### Level of knowledge of STI

This study showed that the majority (93.2%) of the students rated their knowledge about STI as 'poor'. From a total of 693 respondents only 17 (2.5%) students rated their knowledge about STI as 'very good'. Although there are no other studies to compare the data with, the finding is a concern considering the level of education of the students. Perhaps one of the reasons for the 'poor' rating could be due to the fact that the researchers used clinical terms/names with which the students were not familiar. It seems that STI is a neglected topic despite the many awareness programs for HIV/AIDS in Papua

New Guinea. Therefore, it is important that information on the STIs is disseminated to the tertiary institutions as well as secondary schools and the general public. Tertiary students are highly vulnerable in contracting any of the STIs, because of the age of the students, dormitory life style and relationships involving sexual activity. Given that most of the tertiary students in this study rated their STI knowledge as poor, it could be expected that a similar finding would be true for the general public.

### **Difference in the level of knowledge on the basis of gender, age and institution**

Among the three variables of gender, age and institution that were analyzed, there was a significant difference in the level of knowledge on the basis of age and institution. However, on the basis of gender, there was no significant difference in the level of knowledge.

The reason for the difference in the level of knowledge of older respondents in comparison to younger respondents could be attributed to the fact that the older respondents have had longer to be at risk of getting a sexually transmitted infection and being exposed to STI educational and awareness programs.

The second variable that showed a significant difference at the level of knowledge is the *institution* in which the students were studying. In this study the teachers college respondents had the highest level of knowledge. Incidentally, the data also has shown that most of the respondents from teachers college were slightly older in age, and this perhaps contributed to the higher level of knowledge. This result may also mean that teachers college students need to acquire knowledge of STI as it is in the curriculum they are required to teach to pupils during their field teaching experiences. Surprisingly, the tertiary students from the nursing college reported a 'poor' level of knowledge in comparison to other institutions in the study. This could mean that there is an absence of STI related units in their first year of studies and that they had limited knowledge of STI before coming to the nursing college.

### **Prevalence of STI among first year tertiary students**

As the results have shown, approximately 93% of the students reported that they had no sexually transmitted infection. The 34 students who reported to having a STI were able to identify the type of infection through the description given in the questionnaire. The finding is that STI is one of the health issues in tertiary institutions.

### **Education about STI**

About 360 (52%) respondents indicated that they had gained some level of knowledge of STI through formal education before entering tertiary institutions. They had either learnt about STI during their studies in secondary school or through the media or public awareness campaigns. However, a number of respondents (244) also reported that they have never attended any

health awareness sessions on STI. An important element that this study revealed is that many students strongly agreed that they thought that many students may have a STI, but that they were ashamed to reveal it or seek medical attention. Perhaps this is an indication that the tertiary students should have more awareness programs on STI so as to make them feel comfortable to talk about such issues.

Further research is needed to gain more detailed information about educational approaches in tertiary institutions to raise awareness of sexually transmitted diseases. It is important for STI educational programs to be carried out in a culturally sensitive manner to promote responsible attitudes to sexual activity and decrease the spread of STI.

### **Summary and conclusion**

This cross-sectional study among 693 tertiary students in the Madang Province of PNG revealed that the clear majority of the students rated their knowledge of sexually transmitted infections as 'poor'. It was found that there was a significant difference in the level of knowledge about STI, with older students being better informed than younger students and the teachers college students being better informed than students at other institutions. STI was found to exist among the tertiary student population although not at an alarming rate. The majority of the respondents claimed to have never attended any specific programs concerning STI, although it is a topic in school curricula. Many students reported that there was a need for more awareness on STI and they strongly agreed that STI was a serious health issue in PNG.

### **Limitations**

Although this study was first of its kind to be conducted among the tertiary students in PNG and the researchers have succeeded in gathering data from a large sample size, it was not without its limitations. It was a cross sectional study using a self reporting questionnaire, therefore there is a possibility that the respondents might have shied away from being honest which could have affected the results of the study. The number of cases of STI reported was from a structured questionnaire and perhaps clinical testing might have yielded a different result. Asking the participants to identify the infections from a list of clinical terms might have been difficult; perhaps a different method using visual aids or more description on each of those infections might have yielded a different result.

### **Recommendation**

In the light of the findings of this study, the following recommendations are made.

That each tertiary institution in Papua New Guinea consider having clinical testing of students for STIs as part of a medical check during registration so that accurate statistics are obtained and awareness programs can be conducted

at a level deemed necessary. In addition, clinical testing would benefit students by receiving medical treatment for a STI that they may not know they had.

That an increased and more comprehensive effort is needed to increase tertiary students' knowledge and awareness of STIs, their signs, symptoms, treatment and prevention.

That further research is needed to compare the findings of this study with findings from other tertiary institutions in PNG so that policies can be updated to target and help those infected and the whole student body as a whole.

That research is promoted on diagnostic and curative aspects of STI to help people live healthy lives. Although, laboratory facilities are limited for clinical research in this country, such empirical investigation could pave the way for future research.

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