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KNOWLEDGE ATTITUDE AND PRACTICES TOWARDS PREVENTING BEDBUGS AMONG MALE STUDENTS AT KAMPALA SCHOOL OF HEALTH SCIENCES, WAKISO DISTRICT. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Bedbugs are flat brown insects that bite the exposed skin of humans to feed on their blood. The study aims to assess the knowledge attitudes and practices toward preventing bedbugs among male students at Kampala School of Health Sciences.

Methodology

A cross-sectional study utilizing quantitative data collection methods.

Results

Most (96.7%) of the respondents knew that bedbugs feed on human blood whereas least (3.3%) knew that bedbugs feed on others. Most (30%) knew washing clothes as a way used to prevent the spread of bedbugs whereas least (20%) knew storing clothes in plastic bags. Most (61.7%) thought that bedbugs can be prevented whereas least (15%) thought bedbugs cannot be prevented. most (55%) thought about seeking medical attention in case of bedbug infestation whereas, the least (45%) thought of not seeking medical attention in case of a bedbug infestation. The majority (35%) of the respondents wash their clothing and dwellings regularly whereas the the least (10%) have other specific periods of cleaning their homes and clothing. (60%) of the respondents were doing diploma programs whereas the least (40%) were doing certificate programs.

Conclusions

The overall knowledge of the respondents towards the prevention of bedbugs was good and the respondents had a good attitude towards the prevention of bedbugs, their practices towards the prevention of bedbugs were inappropriate for their knowledge and attitude; therefore, effective implementation would require additional factors such as health education on the various practices of prevention of bedbugs and sensitization about bedbug infestation among others.

Recommendations

The school administration should sensitize the students and the community on bedbug infestation, promote personal hygiene and proper sanitation in the school, and seal cracks and crevices in hostels to improve their attitudes and practices towards the prevention of bedbugs.

Keywords: *Bedbug infestation, proper sanitation, Kampala School of Health Sciences*
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Background

Bedbugs are flat brown insects that bite the exposed skin of humans to feed on their blood. The most occurring bedbugs, cimex lactularis are found in almost all continents and cimex hemipterus known as tropical bedbugs resurge in warmer climates of Africa, Asia, and America. Bedbugs may have evolved from cave-dwelling ectoparasites of mammals, especially bats. As humans moved from caves to tents and then to houses, the bedbugs went along with them. Bedbugs have been monitored in literature and folk remedies of many cultures and countries since the times of ancient Greece. Bedbugs became very rare in many industrialized countries after World War 2 because of the widespread use of synthetic insecticides. By 1977, they were so scarce in the United States of America that it was hard to find specimens to use in college entomology classes. (Renzo Salazah, 2015)

Bedbugs are often hard to control because they are nocturnal, seek cryptic harborages, are very small and elusive, and can detect and avoid many chemicals including cleaning agents. Bedbugs could be transported alongside luggage, different kinds of furniture, clothes, and other items. Because they are very thin, except just after a blood meal, they can fit through or hide in narrow cracks. Adults can live for several months and nymphs can survive for three months or longer without feeding. Complete elimination of an established infestation is almost impossible to accomplish

in a single service visit by most PMPS. The bedbug's importance as a pest has increased because of the biting and associated effects, its characteristics and odor, and the public fear of them.

Bedbugs have recently re-emerged as human pests worldwide. Two surveys were carried out in Ohio [Midwest USA] in 2011 and 2016 on the magnitude and spread of bedbug infestations statewide which were 35.6% and 31.6% respectively (Jones, 2021).

In a study carried out on the prevalence and spatial distribution of bedbugs' cimex lectularius infestation in the southwest of Iran, results revealed that according to the spatial distribution map, of 62 areas, 27 of them were infested with bedbugs and the prevalence was at 9.61% in Ahvaz city (Mona Sharififard, 2020).

In a study carried out on the prevalence of bed bug infestation, crowding, and awareness level among government boarding secondary school students in Morsi urban, Tanzania, results revealed that out of 223 students who were infested with bedbugs, 59.6% were boys and 31.5% of the participants were aware of bedbug biology, transmission, and control methods.

In a study on the situation of bedbugs in Lubaga division, Kampala capital city, Uganda, results revealed that out of the 356 respondents interviewed, 69.9% had bedbugs in their homes. (George W Senabulya, 2019). The study aims to assess the knowledge attitudes and practices toward preventing bedbugs among male students at Kampala School of Health Sciences.

Methodology

Study design

The study was a descriptive cross-sectional design because it enabled the collection of data from different individuals at the same time.

Study area

The study was conducted at the Kampala School of Health Sciences located in Buloba 4km away from Mityana road, Wakiso district in the central region of Uganda.

Study population.

The study population was male students of Kampala School of Health Sciences, Wakiso district who voluntarily consented.

Sample size determination.

The sample size was calculated using Burton's formula [1905]

S=2(QR) O

S=required sample size

Number of days that will be spent while collecting data (n=10)

R=maximum number of respondents interviewed per day (n=3)

Maximum time taken on each participant (n=1 hour)

S=2x10x3x1

=60 respondents. Therefore, a sample of 60 respondents will be used.

Sampling technique

A simple random sampling technique was used to select the 60 respondents at the Kampala School of Health Sciences. Each male student was assigned a number that was placed in a box, from which a number was picked at random without replacement where each male student had an equal chance of being selected to participate in the study.

Sampling procedure

The researcher gave questionnaires to all male students staying in hostels on the days of data collection. An equal opportunity to participate in the study was observed by asking the male students to randomly pick a piece of uniformly folded paper from an enclosed box that either contained the word YES or NO in it. Any male student who picked a paper with the word YES was asked to participate in the study and this continued until the required number of respondents

(60) Was reached.

Data collection method

Self-administered questionnaires organized according to research objectives were used to collect data for the study. This is because it was cheap and respondent-friendly.

Data collection tools

Well-organized self-administered questionnaires with closed-ended questions prepared in the English language were used to collect data from the respondents with the aid of a research assistant who helped to obtain the data required from the respondents.

Data collection procedure.

Data collection was conducted by the researcher with the help of a research assistant after obtaining permission from the administration of the Kampala School of Health Sciences. The researcher introduced himself to the subjects and told them the objectives of the study, got consent, and proceeded with the study procedures.

Piloting the study

A pilot study was conducted in the male student hostels at Buloba Technical Institute in June 2023 to assess for accuracy, reliability, and competences of the questionnaires.

Independent variables
The independent variable was the knowledge attitude and practices of male students.

Dependent variables
The dependent variable was the prevention of bedbugs in male student hostels at Kampala School of Health Sciences.

Quality control
Quality control was ensured by conducting a pilot study and double-checking of the study instruments and responses. Pretesting enabled the determination of the validity and reliability of the study tools and permitted due adjustments to be made.

Data analysis and presentation.
Data was entered and analyzed using a statistical package for social scientists' version 10 [SPSS10]. Quantitative data was presented using tables, charts, and graphs and analyzed using cross-tabulation and chi-square while qualitative data was presented using descriptive narratives and analyzed using themes.

Ethical considerations.
The researcher introduced the topic, purpose, and significance of the study to the respondents. Informed consent was obtained from each respondent and the respondent retained the right to withdraw from participation or refuse to participate in the study at any point if he or she felt uncomfortable to continue without penalty. Ethical approval to conduct the study was obtained from the Kampala School of Health Sciences board after analyzing all ethical issues.

Results

Table 1: shows the demographic data of respondents.
Study setting not complete (N=60)

Age	**Frequency (f)**	**Percentage (%)**
17-25 years	38	63.3
26-38 years	14	23.3
39-42 years	5	8.4
43 and above	3	5
Total	**60**	**100**
Tribe	**Frequency (f)**	**Percentage (%)**
Muganda	17	28.3
Musoga	11	18.3
Munyankole	10	16.7
Others	22	36.7
Total	**60**	**100**
Program	**Frequency (f)**	**Percentage (%)**
Certificate	24	40
Diploma	36	60
Total	**60**	**100**
Residential status	**Frequency (f)**	**Percentage (%)**
Resident	44	73.3
Non-resident	16	26.7
Total	**60**	**100**

From Table 1, the majority (63.3%) of the respondents were between 17-25 years whereas the minority (5%) were 45 years and above.

From the table above, the majority (36.7%) of the respondents were from different tribes whereas the minority (16.7%) were Banyankole.

From the table above, most (60%) of the respondents were doing diploma programs whereas the least (40%) were doing certificate programs.

From the table above, most (73.3%) of the respondents were residents whereas the least (26.7%) were non-residents.

Knowledge of the prevention of bedbugs among male students.

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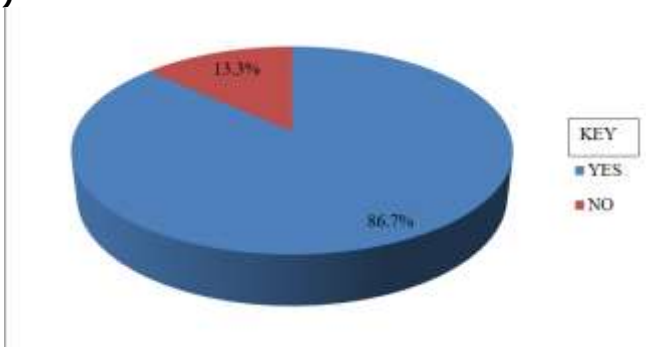
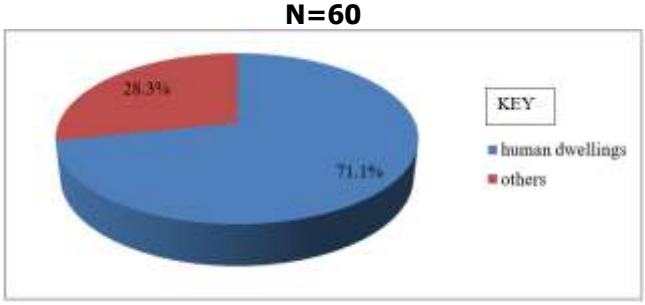
Figure 1: Shows the distribution of respondents according to whether they had ever heard about bedbugs. (N=60)



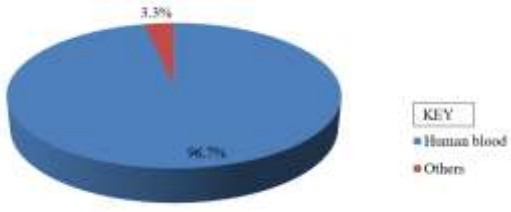
From figure 1, most (86.7%) of the respondents had ever heard about bedbugs whereas least (13.3%) had never heard about bedbugs.

Figure 2: Shows the distribution of respondents according to the bedbug habitats they knew. N=60



From Figure 2, the majority (71.1%) of the respondents knew that bedbugs lived in human dwellings while the minority (28.3%) of the respondents knew other places where bedbugs lived.

Figure 3: Shows the distribution of respondents according to what bedbugs used to feed on. (N=60)



From Figure 3, most (96.7%) of the respondents knew that bedbugs feed on human blood whereas the least (3.3%) of the respondents knew that bedbugs feed on others.

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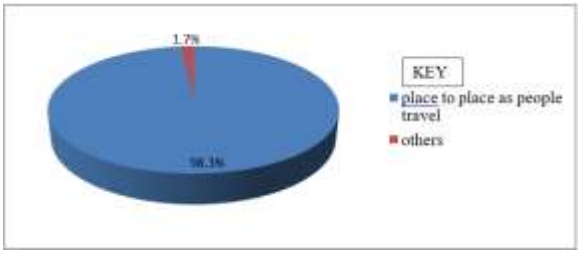
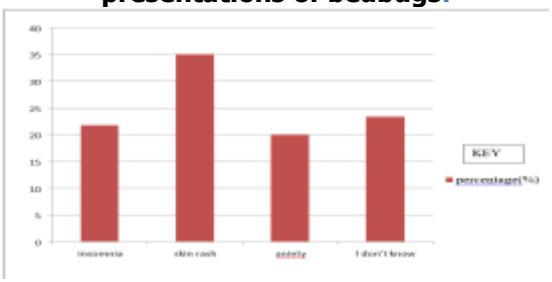
Figure 4: Shows the distribution of respondents according to their knowledge of how bedbugs spread. (N=60)



From Figure 4, the majority (98.3%) of the respondents reported that bedbugs spread from place to place as people travel whereas the least (1.7%) reported other ways of the spread of bedbugs.

Figure 5: Shows the distribution of respondents according to what they knew about clinical presentations of bedbugs.



From Figure 5, the majority (35%) of the respondents reported skin rash whereas the least (20%) of the respondents reported anxiety.

Table 2: Shows the distribution of respondents according to the different ways used to prevent the spread of bedbugs they knew. (N=60)

ways to prevent the spread of bedbugs	Frequency (f)	Percentage (%)
Dry your clothes	**16**	**26.7**
Store clothes in sealed plastic bags	**12**	**20**
Seal cracks and crevices	**14**	**23.3**
Washing clothes regularly	**18**	**30**
Total	**60**	**100**

From Table 2, most (30%) of the respondents knew washing clothes as a way to prevent the spread of bedbugs whereas the least (20%) knew about storing clothes in plastic bags.

Attitude towards the prevention of bedbugs among male students.

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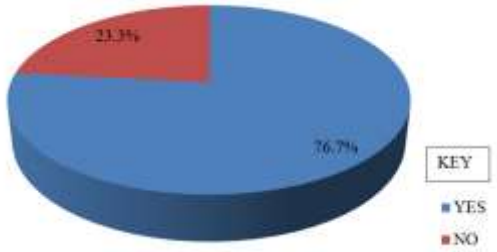
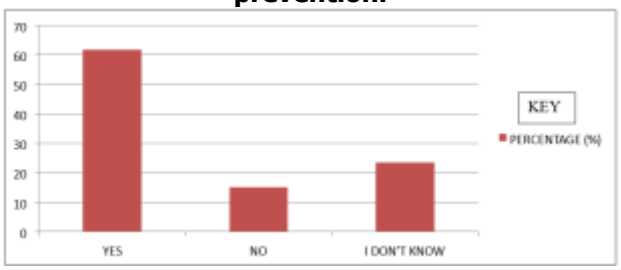
Figure 6: Shows the distribution of respondents according to their thoughts about bedbugs being serious and life-threatening.



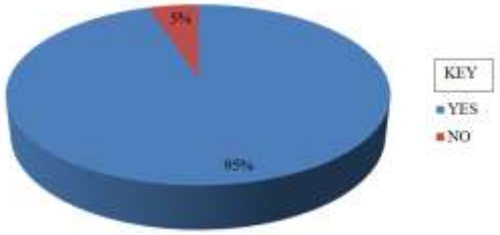
From figure 6, most (76.7%) of the respondents thought about bedbugs being serious and life-threatening whereas the least (23.3%) thought about bedbugs not being serious and life-threatening.

Figure 7: Shows the distribution of respondents according to their thoughts about bedbug prevention.



From Figure 7, most (61.7%) of the respondents thought that bedbugs can be prevented whereas least (15%) thought bedbugs cannot be prevented.

Figure 8: Shows the distribution of respondents according to their thoughts about washing clothes and dwellings as one way to prevent bedbug infestation. N=60



From Figure 8, most (95%) of the respondents thought washing clothes and dwellings was one way of preventing bedbug infestation.

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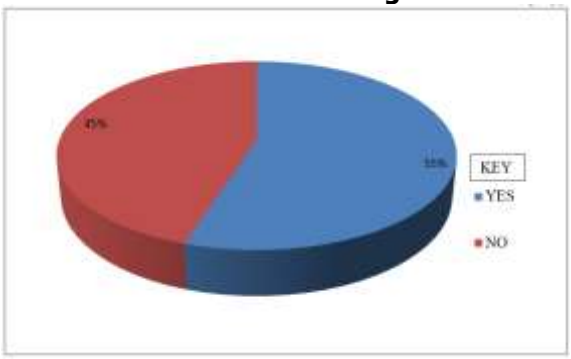
Figure 9: Shows the distribution of respondents according to their thoughts about seeking medical attention in case of bedbug infestation. N=60



From Figure 9, most (55%) of the respondents thought about seeking medical attention in case of bedbug infestation whereas, the least (45%) thought of not seeking medical attention in case of a bedbug infestation.

Practices towards the prevention of bedbugs among male students.

Table 3: Shows the distribution of respondents according to how often they used clean their dwellings and clothing. N=60

Variable	Frequency (f)	Percentage (%)
Regularly	21	35
After 3 days	15	25
Weekly	18	30
Others	6	10
Total	**60**	**100**

From Table 3, most (35%) of the respondents wash their clothing and dwellings regularly whereas the least (10%) have other specific periods of washing their dwellings and clothing.

Table 4: Shows the distribution of respondents according to how other members next to them often clean their dwellings and clothing. N=60

Variable	Frequency (f)	Percentage (%)
Regularly	11	18.3
Weekly	19	31.7
I don't know	21	35
Other	9	15
Total	**60**	**100**

From Table 4, most (35%) of the respondents reported that they didn't know how often other members next to them cleaned their dwellings and clothing whereas the least (15%) reported others.

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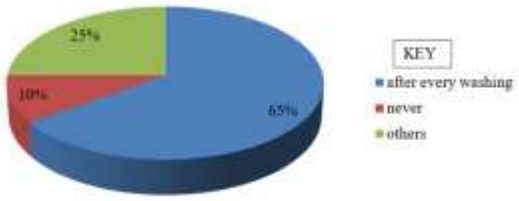
Figure 10: Shows the distribution of respondents according to how often they iron their clothing



From figure 10, most (65%) of the respondents reported ironing their clothes after every washing whereas least (10%) never ironed their clothes at all.

Table 5: Shows the distribution of respondents according to how they clean their houses. N=60

Variable	Frequency	Percentage (%)
Daily	25	41.7
Weekly	14	23.3
Never	11	18.3
Other	10	16.7
Total	**60**	**100**

From the table above, most (41.7%) of the respondents cleaned their houses daily whereas the least (16.7%) had other durations of cleaning their houses.

Table 6: Shows the distribution of respondents according to their responses if the school sealed cracks and crevices in their houses. N=60

Variable	Frequency	Percentage (%)
YES	22	36.7
NO	38	63.3
Total	**60**	**100**

From Table 6, most (63.3%) of the respondents said the school did not seal cracks and crevices in their houses whereas the least (36.7%) said the school sealed cracks and crevices in their houses.

Table 7: Shows the distribution of respondents according to their responses if the school sprays their houses using insecticides. N=60

Variable	Frequency	Percentage (%)
YES	26	43.3
NO	34	56.7
Total	60	100

From Table 7, the majority (56.7%) of the respondents said the school did not spray their houses with insecticides whereas the least (43.3%) said the school sprayed their houses with insecticides.

Discussion

Knowledge of the prevention of bedbugs among male students

From the study above, most (86.7%) of the respondents had ever heard about bedbugs and this implied that their awareness of bedbug infestation was relatively high. This could be due to increased bedbug infestation in the school and the community at large, lectures on environmental health among others. The study results were in agreement with a study conducted on Ahvaz residents by Alizadeh Ismaeil et al, 2017 on knowledge and prevalence of bedbugs where findings revealed that 72% of the residents, university students, and health workers knew the bedbug.

The study showed that the majority (71.1%) of the respondents knew that bedbugs live in human dwellings. This could be due to the presence of bedbugs in their clothes, bed sheets, and mattresses among others. The study results were in agreement with a study conducted on the situation of bedbugs in the Lubaga division by George et al, 2019 where findings showed that 69.9% of the respondents had bedbugs in their dwellings.

In regards to what bedbugs feed on, the majority (96.7%) of the respondents revealed that bedbugs feed on human blood. This is probably due to the frequent and repeated bites from the bedbugs in the night and, the appearance of blood on killing the bedbug among others. This was in agreement with research carried out on the identification, knowledge, and awareness of people regarding bedbugs by Alizadeh Ismaeil et al, 2017 where results showed that most (75%) of the respondents recognized blood feeding as medical importance of bedbugs.

The study showed that the majority (98.3%) of the respondents reported that bedbugs spread from place to place as people travel. This could be because bedbugs live in human dwellings. The results were in agreement with a study conducted on the magnitude and spread of bedbug infestations statewide in Ohio by Jones et al, 2021 where results showed that the majority (63%) of the respondents revealed that bedbugs are spread from place to place as people travel.

In regards to bedbug clinical presentations, the majority (35%) of the respondents mentioned skin rash as a clinical presentation of bedbug infestation. This is attributed to the increased bites in the night by the bedbugs. This is in agreement with a study conducted on the knowledge about bedbugs by Benoit et al, 2017 where results revealed that the majority (60%) of the respondents mentioned systemic skin reactions as a clinical presentation of bedbug manifestation.

About the ways used to prevent the spread of bedbugs, the majority (30%) of the respondents revealed that washing clothes regularly is one way used to avoid the spread of bedbugs. This can be due to the constant removal of bedbugs from the clothes during washing. This study's results were however in disagreement with a study which was conducted in Eastern Tanzania by Ladslaus et al, 2020 on knowledge, risk factors, and practices about bedbugs where washing clothes as one way to prevent bedbug infestation was the least (12%).

Attitude towards the prevention of bedbugs among male students

The studies showed that most (76.7%) respondents thought bedbugs were serious and life-threatening. This implied that the majority of the respondents had suffered from various clinical presentations of bedbug infestation like skin rash, insomnia, and anxiety among others. These study findings agree with a study by Stephen L Dogget, et al, 2018 on advances in the biology and management of modern bedbugs where results revealed that the majority (73.2%) of the respondents said bedbugs were serious and life-threatening.

Study results showed that the majority (61.7%) of the respondents said yes to their thoughts on whether bedbugs could be prevented. This implied that the respondents had a good attitude toward the prevention of bedbugs. These findings are in agreement with a study by Karunamorthi et al, 2015 on containment practices for bedbugs in a limited resource setting in Ethiopia where results revealed that the majority (82.3%) of the respondents said that bedbugs could be prevented.

In regards to respondents' thoughts about washing clothes and dwellings as one way of preventing the spread of bedbugs, the majority (95%) of the respondents said yes. This could be due to the frequent removal of the bedbugs from clothes and dwellings by water. These findings are in agreement with findings from a study by Ladalaus et al, 2020 on the knowledge, risk factors, and practices about bedbugs in rural Eastern Tanzania where results showed that the majority (32.4%) of the respondents thought about washing as one way of preventing bedbug spread.

In regards to respondents' thoughts about seeking medical attention in case of bedbug infestation, results showed that the majority (55%) of the respondents said yes. This could be due to a previous history of bedbug infestation among the respondents where they suffered from various bedbug clinical presentations like insomnia, anxiety, and skin rash among others. These study findings were in agreement with a study by Abate et al, 2019 on attitudes about bedbugs and bedbug infestation on health impact where results showed that the majority (58%) of the respondents thought of seeking medical attention in case of bedbug infestation.

Practices towards the prevention of bedbugs among male students

From the study above, most (35%) of the respondents cleaned their dwellings and clothing regularly. This could be due to the presence of enough water at school. These findings are in agreement with a study by Ladslaus on knowledge risk factors and practices about bedbugs in rural Eastern Tanzania where results showed that most (45.9%) of the respondents cleaned their dwellings and clothing daily.

About how often other members next to the respondents cleaned their dwellings and clothing, the majority (35%) of the respondents said they didn't know. This could be due to poor association with other members next to them. These study results were in agreement with a study by George et al, 2019 on the situation of bedbugs in the Lubaga division where results revealed that the majority (56%) of the respondents didn't know how often the people next to them cleaned their clothes.

In regards to how often the respondents ironed their clothes, results showed that the majority (65%) of the respondents ironed their clothes after every washing. This could be due to their need to be smart always. These findings are in disagreement with a study by Ladslaus et al, 2020 on knowledge, risk factors, and practices about bedbugs in rural Eastern Tanzania where results showed that the majority (45%) of the respondents never ironed their clothes.

Study findings revealed that the majority (41.7%) of the respondents cleaned their houses daily. This could be due to proper health education on good sanitation. This is in agreement with a study conducted by Ladslaus et al, 2020 on the knowledge, risk factors, and practices about bedbugs where results revealed that the majority (68%) of the respondents cleaned their homesteads daily.

From the study above, the majority (63.3%) of the respondents reported no on whether the school sealed cracks and crevices in their houses. This could be due to the non-awareness of the cracks and crevices in the school. These study results were in disagreement with a study by Karunamorthi et al, 2015 where results revealed that the majority (91.2%) of the respondents sealed cracks and crevices in their houses.

Finally, the study results revealed that the majority (56.7%) of the respondents reported no on whether the school sprays their houses using insecticides. This could also be due to the nonawareness of bedbug infestation in the students' houses by the school. These study results were in disagreement with a study by Karunamorthi et al, 2015 where results revealed that the majority (89.3%) of the respondents sprayed their houses with insecticides.

Conclusions

Therefore the researcher generally concluded that, although the overall knowledge of the respondents towards the prevention of bedbugs was good and the respondents had a good attitude towards the prevention of bedbugs, their practices towards the prevention of bedbugs were inappropriate for their knowledge and attitude; therefore, effective implementation would require additional factors such as health education on the various practices of prevention of bedbugs and sensitization about bedbug infestation among others.

Recommendations

The Ministry of Health should emphasize and carry out community health education and radio talk shows. This would at least ensure that there is an increase in awareness and basic knowledge towards the prevention of bedbugs.

The government should ensure the free distribution of insecticides to various communities and schools for spraying of bedbugs as a way of bedbug control.

The school administration should sensitize the students and the community on bedbug infestation, promote personal hygiene and proper sanitation in the school, and seal cracks and crevices in hostels to improve their attitudes and practices towards the prevention of bedbugs.

The students should maintain proper personal hygiene and sanitation to prevent the spread of bedbugs.

The researcher recommends other researchers carry out research on bedbug infestation in various institutions like universities, and high schools to improve the students' knowledge, attitude, and practices towards preventing bedbugs.

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List of abbreviations

PMPS: Pest Management Professionals
USA: United States of America

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Conflict of interest

No Conflict of interest

Author Biography

Mohammed Juma is a student with a Diploma in clinical medicine and community health at Kampala School of Health Sciences.

Alex Katwe is a tutor at the Kampala School of Health Sciences.

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