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ASSESSMENT OF STUDENT AWARENESS AND KNOWLEDGE ABOUT CONTAMINATED MOBILES AT COLLEGES IN KUWAIT

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ABSTRACT: *In this era, most people of all ages possess a mobile phone; these mobiles are essential gadgets that became significantly advanced in technology and are convenient for communication, making life easier globally. The aim of this study is to investigate and assist the students' Awareness and Knowledge about Contaminated mobiles at colleges in Kuwait. A self- administered questionnaire was distributed among 150 college students that were randomly selected and were asked to answer the questionnaire genuinely. These college students were from different departments such as; Medical laboratory, dental, natural science, nutrition, the department of pharmacology and nursing college. The questionnaire was analyzed statistically using SPSS versionV26. Results show that college students had a lack of awareness, knowledge attitude and behavior towards contaminated mobiles and the transmission of pathogens.*

KEYWORDS: Microorganism, mobiles, contamination, pathogens, students, infection.

INTRODUCTION

Mobile phones are increasingly being utilized for our personal, professional and social lives**[1]**, it provides many services, not only standard voice function of telephone but also internet browsing , MMS for sending and receiving photos and video, SMS for texting, GPS. However, with all the benefits of the mobile, it is easy to negligent and overlooks the hazardous health threat it may pose to the users **[2]**. Mobile phones are considered to be breeding reservoirs for many different microorganisms that have the ability to become pathogenic, and are rapidly spread when conditions are favorable for their growth; such conditions include warm temperature, moisture, and darkness. Mobile phones could become contaminated through various sources like the human skin, hands, bags, phone pouches, pockets, environment and food particles. These sources cause colonization of

microorganisms on the mobiles that promote the transmission disease from mild to chronic disease **[15]**. Poor personal hygiene is one of the important elements for mobile contamination. It is a fact that the human skin is always in contact with germs and becomes easily colonized by some species of microorganisms. The human adult is protected with approximately $2m^2$ of skin that covers the body and has a surface area that carries about 10^{12} bacterial cell/ person **[12].** While phoning, the mobile comes into close contact or touches different parts of the contaminated body, with hand to hand, hand to mouth, nose and ears **[13]**. College students train usually in laboratories and hospitals and are dealing with patient's blood, hospital equipment's, microorganisms in microbiology lab., gum teeth and sputum, nutrients in the nutrition labs., certainly they are restricted to use mobile phones in these areas for safety reasons, because mobiles can cause contamination in the sterile zones, not only in the microbiology labs but also other labs and hospitals. Unfortunately, some students do not follow the rules and use their mobile phones that get easily contaminated and serve as vehicles for the transmission of microorganisms and other nosocomial pathogens **[3].** Other studies on mobiles that have the ability to transmit nosocomial pathogens have been studied before **[**4,5,6**].** One study found that microbial contamination of mobile phones of college students was 98%: Gram-positive bacillus (30%), Gram-negative bacillus (8%), Staphylococcus spp. (14%), Escherichia coli (16%), Enterococcus (18%), Coliform (8%), Micrococcus (1%) and aerobic spores (1%) **[**16**]**. Moreover, it is possible in dentistry, a direct transfer of pathogens via both contaminated hands and\or tools **[**17,18-20**]**. In the United States, students and employees were exposed to two disease outbreaks of Salmonella Typhimurium in clinical and microbiology laboratories when handling these pathogens inappropriately **[**21**]**. In addition, Students also share their contaminated mobiles with friends and family members, passing on diseases and infections to the society. Nevertheless, healthcare workers and non- healthcare workers may facilitate the transmission of pathogenic bacteria when sharing their mobiles among each other **[**14**]** . Patients, healthcare workers, healthcare professionals and visitors all use their mobiles frequently in the hospitals but fail to clean their mobile phones regularly **[**7**],** and when the mobiles get contaminated; they induce the transition of diseases throughout the hospital and between patients, other members of the hospital and visitors, thus spreading the disease among the population of the community **[8,9,10]**. It has been estimated nearly one third of these infections could be prevented when fallowing the standard infection control guidelines **[**11**]**. The purpose of this study is to investigate and assist the students' Awareness and Knowledge about Contaminated mobiles at colleges in Kuwait.

METHODS

In this study a self- administered questionnaire was distributed among 150 college students that were randomly selected and were asked to answer the questionnaire genuinely about their awareness of mobile contamination and the transmission of disease. These college students were from different departments such as; Medical laboratory, dental, natural science, nutrition, the department of pharmacology and nursing college. From the 150 students only 144 students participated in the study because 6 students had incomplete questionnaires that had been removed. The questionnaire was divided into three parts, general information that included (age, gender, academic year, GPA) part 2 were (Yes) and (No) question that was related to Knowledge and awareness questions, part 3 was involved with their attitude and personal use of mobiles. Data was collected and statistical analysis was performed by SPSS version V.26.

RESULTS

The aim of this study is to investigate and assist the students' Awareness and Knowledge about Contaminated mobiles at colleges in Kuwait. Up to 144 students participated in the study. Statistical Package for Social Sciences SPSS V.26 was used to analyze the data obtained.

Demographic Characteristics

Table 1: Demographic Characteristics for the respondents (n=144)

Characteristics	Category	n	%
Gender	Male	65	45.1%
	Female	79	54.9%
Age	17-19 years	70	48.6%
	20-22 years	52	36.1%
	Above 23 years	22	15.3%
Nationality	Kuwaiti	98	68.1%
	Non-Kuwaiti	46	31.9%
Academic Year	First	88	61.1%
	Second	39	27.1%
	Third	13	9.0%
	Forth	4	2.8%

As presented in the above table, gender ratio is in favor of females (54.9%, n=79). Slightly less than a half of the students who participated in the study (48.6%, n= 70) were between 17 and 19 years at the time of the survey, followed by 52 (36.1%) were between 20 and 22 years. Majority of the respondents were Kuwaiti (68.1%, n=98). With regard to the academic year, majority of the respondents who participated in the survey (61.1%, n=88) were from the first level, followed by 39 (27.1%) were from the second level (see also figures 1, 2, 3, and 4 below).

Figure 1: Gender

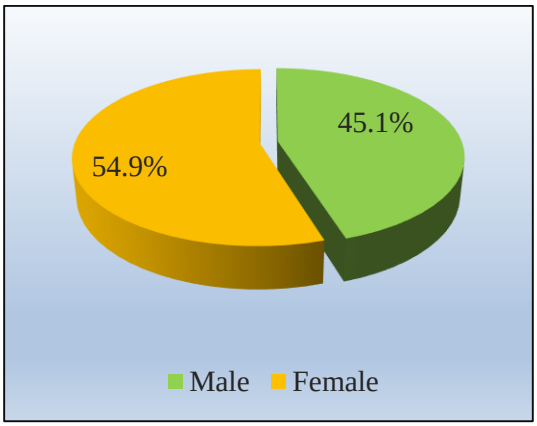


Figure 2: Age

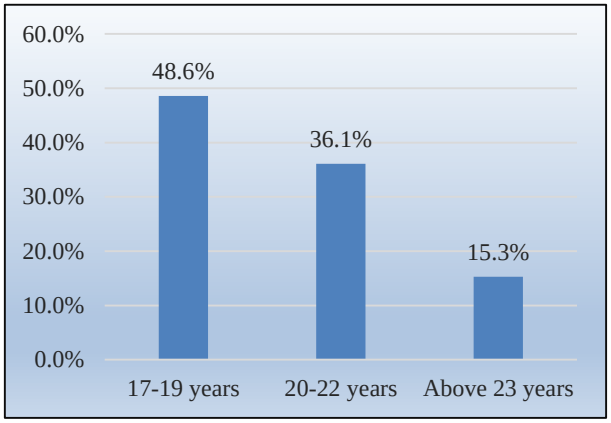


Figure 3: Nationality

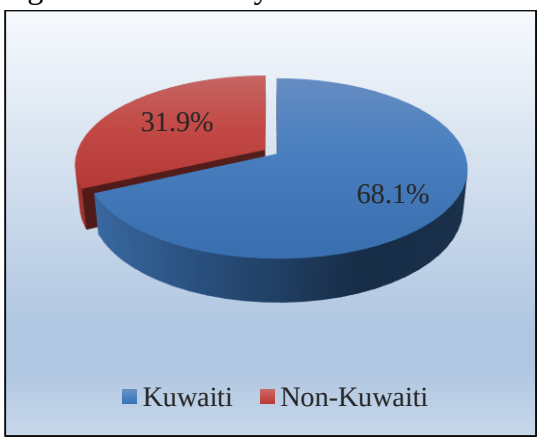
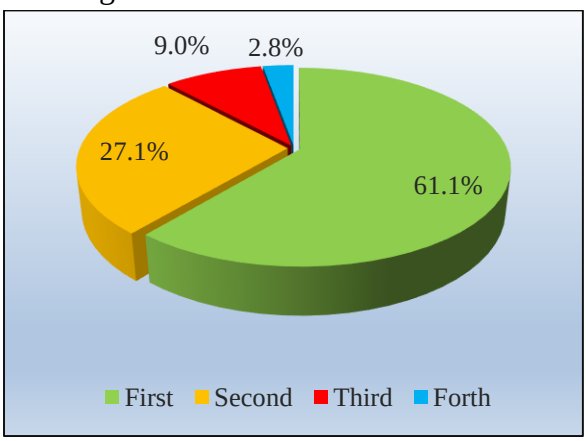


Figure 4: Academic Year



Awareness and Knowledge of students about contaminated mobiles:

As Table 2 below shows, the following results can be figure out:

- Most of the students use the mobile (97.9%, n=141).
- Closed to three fifths of the students (59%, n=85) do not use their mobiles in the washroom, while 30.6% of them (n=44) use it there.
- Up to 53.5% (n=77) of the students use your mobile for dining,

- More than three quarters of the students (78.5%, n=113) have a phone cover
- Most of the students (79.9%, n=115) do clean their mobiles
- Two thirds of the students who participated in the study (66.7%, n=96) do clean their mobiles' covers.
- Slightly more than three quarters of the students (76.4%, n=110) use their mobiles at bed time
- Most of the students place their mobiles during sleep near their beds (85.4%, n=123).
- Closed to two thirds of the students who participated in the study (67.4%, n=97) keep their mobiles near their heads during sleeping, while 24.3% (n= 35) do not do that.
- Slightly more than a half of the students (51.4%, n=74) do not know if there are germs on their mobiles, while two fifths of them (40.3%, n=58) responded positively.
- Majority of the respondents (70.8%, n=102) do not wash their hands after using the mobile.
- Three quarters of the students (75.0%, n=108) wash their hands frequently.
- Close to a half of the students (50.7%, n=73) considered themselves unaware about contamination of mobiles, while 47.2% of them (n=68) responded positively.
- Majority of the students (63.2%, n=91) considered themselves aware about the physical effects of mobiles on them, while 30% of them (n=43) responded negatively.
- Closed to three fifths of the students who participated in the study (59.7%, n= 86) considered themselves aware about the side effects of mobiles, while slightly more than one quarter of the (26.4%, n=38) do not aware about that.
- Slightly more than a half of the students (52.1%, n=75) were not aware that mobiles can transmit pathogenic infections, while up to 45.8% of them (n=66) considered themselves aware about that.
- Majority of the students (70.1%, n= 101) reported that mobile has changed their life style, while closed to one fifth of them responded negatively (20.1%, n= 29).
- Most of the students who participated in the study (86.8%, n= 125) reported that they were not allowed to use their mobiles in the laboratory.
- More than three fifths of the students (63.2%, n= 91) reported that they didn't text in the classroom

Table 2: Responses of the students regarding awareness and knowledge about contaminated mobiles (n=144)

Statement		Yes	No	Sometimes
Do you use the mobile	n	141	1	2
	%	97.9%	0.7%	1.4%
Do you use your mobile in the washroom	n	44	85	15
	%	30.6%	59.0%	10.4%
Do you use your mobile for dining	n	77	37	30
	%	53.5%	25.7%	20.8%
Do you have a phone cover	n	113	26	5
	%	78.5%	18.1%	3.5%

Do you clean your mobile	n	115	11	18
	%	79.9%	7.6%	12.5%
Do you clean your mobile cover	n	96	28	20
	%	66.7%	19.4%	13.9%
Do you use your mobile bed time	n	110	14	20
	%	76.4%	9.7%	13.9%
Do you place you mobile during sleep near your bed	n	123	14	7
	%	85.4%	9.7%	4.9%
Is your mobile during sleep near your head	n	97	35	12
	%	67.4%	24.3%	8.3%
Do you know if there are germs on your mobile	n	58	74	12
	%	40.3%	51.4%	8.3%
Do you wash your hands after using the mobile	n	20	102	22
	%	13.9%	70.8%	15.3%
Do you wash your hands frequently	n	108	10	26
	%	75.0%	6.9%	18.1%
Are you aware about contamination of mobiles	n	68	73	3
	%	47.2%	50.7%	2.1%
Are you aware about the physical effects of mobiles on you	n	91	43	10
	%	63.2%	29.9%	6.9%
Are you aware about the side effects of mobiles	n	86	38	20
	%	59.7%	26.4%	13.9%
Are you aware that mobiles can transmit pathogenic infections	n	66	75	3
	%	45.8%	52.1%	2.1%
Has the mobile changed your life style	n	101	29	14
	%	70.1%	20.1%	9.8%
Are you allowed to use your mobile in the laboratory	n	13	125	6
	%	9.0%	86.8%	4.2%
Do you text in the classroom	n	26	91	27
	%	18.1%	63.2%	18.8%

Table 3: Descriptive statistics for the scores of awareness and knowledge about contaminated mobiles (n=144

Measure	**value**	**Measure**		**value**
N	144	Range		43
Mean	33.0	Minimum		11
Std. Error of Mean	0.67	Maximum		54
Median	33.00	Percentiles	25	27.00
Std. Deviation	8.10		50	33.00
Coefficient of Variation	24.5%.		75	37.75

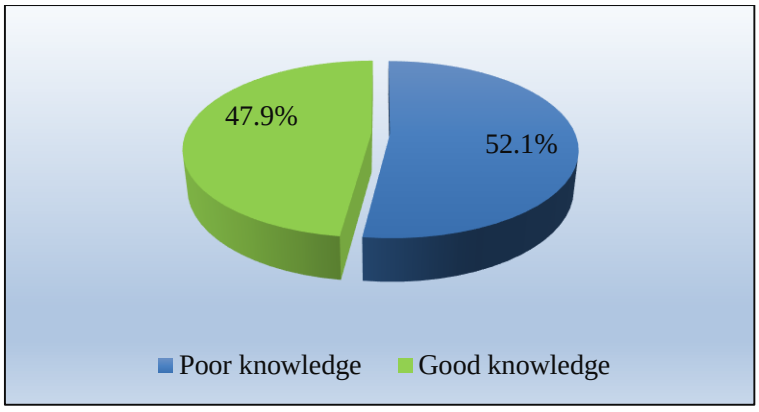
Source: SPSS Output Based on the Researchers own Survey, Jan. 2020.

Descriptive statistics for the total scores of awareness and knowledge about contaminated mobiles were calculated for the respondents detailed in the table 3 above. It is important to mention that there were three options to answer "Yes, No, and sometimes" to 19 questions that would result in a score of zero, and best knowledge score of awareness and knowledge about contaminated mobiles (the full mark) should be 57.

The minimum score was 11 and the maximum was 54 with range of 43, which indicates that there was a wide disparity between participants in their scores of awareness and knowledge about contaminated mobiles. The mean of the score was 33.0 (S.E. = ± 0.67) with a median of 33.0, which indicates that the distribution of the scores is symmetric. The standard deviation of the scores was 8.10, suggesting that the coefficient variation of the scores was 24.5%. Finally, the 75th percentile indicates that 75% of the participants in the survey made a total score of 37.75 or below in awareness and knowledge about contaminated mobiles and it means that only 25% scored above 37.75.

When categorized student's awareness and knowledge about contaminated mobiles more than a half of the students (52.1%, n=75) had poor knowledge (p-value > 0.05) with $(95\%\ CI, 43.8\% - 60.4\%)$ while the rest of them (47.9%, n=69) had good knowledge $(95\%\ CI, 39.6\% - 56.2\%)$.

Figure 4: Levels of awareness and knowledge about contaminated mobiles



Students' Attitudes and behavior towards mobiles:

In a question in the survey labeled "At what age did you possess a mobile phone?" closed to 40% of the students reported that they possessed it when they were at 14 years of age (n= 57), while one quarter of them possessed a mobile phone when they were at 10 years of age (25%, n= 36). In addition, there was 34 students (n= 23.6%) reported that they possessed a mobile phone when they were at 16 years of age (see Table 4 below).

Table 4: Sample description- age when possessing a mobile phone

Age	n	%
At 10 years of age	36	25.0%
At 14 years of age	57	39.6%
At 16 years of age	34	23.6%
At age 18 and above	17	11.8%
Total	**144**	**100.0**

Table 5: Sample description- type of mobile owned

Types	n	%
Normal keypad	1	0.7%
Touch screen	121	84.0%
Both	22	15.3%
Total	**144**	**100.0**

As Table 5 shows, most of the students who participated in the survey indicate that they experienced Touch screen mobiles.

With regard to the place where the respondents usually keep their mobiles, more than the half of the respondents reported that they keep them in their pockets (52.8%, n= 76), while up to 67 of them (46.5%) indicated that they keep their mobiles in bags.

Table 6: Sample description- place where the respondents usually keep their mobiles

Responses	n	%
In the bag	67	46.5%
Pocket	76	52.8%
Belt pouch	1	0.7%
Total	**144**	**100.0**

Table 7: Reasons for using mobile in the washroom

Reasons	n	%
Answering phone calls	21	16.9%
Playing games	27	21.8%
Texting	14	11.3%
Listening to music	4	3.2%
All the above	58	46.8%
Total	**124**	**100.0**

Slightly greater than one fifth of the students (21.8%, n=27) playing games while they were in the washroom, followed by 21 (16.9%) answering phone calls there. In general, majority of the respondents used the mobile in the washroom for four reasons as Table 7 above showed.

Table 8: Reasons for using mobile during eating time

Reasons	n	%
Answering phone calls	28	20.6%
Playing games	4	2.9%
Texting	16	11.8%
Taking pictures	3	2.2%
Browsing	39	28.7%
All the above	46	33.8%
Total	**136**	**100%**

Likewise, slightly greater than one third of the students (33.8%, n=46) using mobile during eating time for many reasons. Specifically, up to 28.7% (n=39) of them were browsing the mobile during eating time, while 20.6% (n=28) using mobile during eating time to answer the calls.

Table 9: Sample description- Kind of phone cover owned

Responses	n	%
I don't use a mobile cover	35	24.3%
A closed cover	72	50.0%
A perforated cover	37	25.7%
Total	**144**	**100%**

As Table 9 shows, a half of the students who participated in the survey indicate that they used a closed cover for their phones, while slightly greater than one quarter of them (25.7%, n=37) used a perforated cover. The rest of the respondents (24.3%, n=35) does not use a mobile cover.

Table 10: Sample description- daily time spent for using phone

Time length	n	%
Less than one hour	4	2.8%
2- 4 hours	30	20.8%
5- 8 hours	55	38.2%
9- 12 hours	21	14.6%
More than 12 hours	34	23.6%
Total	**144**	**100%**

Slightly less than two thirds of the respondents spent between 5 to 8 hours daily in using phones for different things, while 34 (23.6%) of them more than the half of the day, and 30 (20.8%) spent between 2 to 4 hours daily in using phones for different things.

Table 11: Tool used for cleaning mobile and mobile cover

Tools	for cleaning mobile		for cleaning mobile's cover	
	n	%	n	%
Mobile cloth	10	6.9%	9	6.3%
My clothes	10	6.9%	14	9.7%
Tissue paper	23	16.0%	16	11.1%
Wet tissue	62	43.1%	56	38.9%
Lens paper	4	2.8%	4	2.8%
Sterile alcohol swab	23	16.0%	16	11.1%
Nothing	12	8.3%	29	20.1%
Total	**144**	**100%**	**144**	**100%**

While up to 62 respondents (43.1%) used wet tissue for cleaning their mobiles, slightly less than two fifths of them rely on wet tissue (38.9%, n= 56) for cleaning their mobiles' covers. It worth to mention here that, closed to one fifth of the respondents (20.1%, n=29) does not clean the cover of the mobile.

Table 12: Chemical cleansers used for mobile cleaning

Chemical cleansers	n	%
Detergent	44	30.6%
Antimicrobial spray	11	7.6%
Sterile solution	32	22.2%
Don't know	47	32.6%
I Don't clean it	10	7.0%
Total	**144**	**100%**

Up to 44 students (30.6%) used Detergent for mobile cleaning, followed by 32 (22.2%) used Sterile solution. Closed to one third of the respondents do not know what is the proper tool should be used for mobile cleaning (32.6%, n= 47).

Table 13: Frequent of cleaning mobile

Responses	n	%
Daily	38	26.4%
Weekly	60	41.7%
Monthly	33	22.9%
Yearly	6	4.2%
Never	7	4.8%
Total	**144**	**100%**

As presented in Table 13 above, majority of the respondents (41.7%, n=60) indicated that they cleaned their mobiles weekly, followed by 38 (26.4%) cleaned their mobiles daily, and 33 (22.9%) cleaned their mobiles monthly.

Table 14: Method used for mobile cleaning

Responses	n	%
Wiping the outer surface only	67	46.5%
Wiping the inter space of the key	30	20.8%
Wiping by removing the key and cover part	47	32.7%
Total	**144**	**100%**

In a question in the survey labeled "How do you clean your mobile?" majority of the students reported that they wiping the outer surface only (46.5%, n=67), while closed to one third of them (32.7%, n=47) wiping by removing the key and cover part, and the rest of them (20.8%, n= 30) wiping the interspaces of the key.

Table 15: Daily Practice of hand washing

Responses	n	%
Approximately 10 times	94	65.3%
Approximately 20 times	35	24.3%
More than 20 times	15	10.4%
Total	**144**	**100%**

Majority of the surveyed students (65.3%, n=94) reported that they practicing hand washing approximately 10 times a day, followed by 35 (24.3%) practicing hand washing approximately 20 times a day.

Table 16: Microorganisms users expected on their mobiles

Responses	n	%
Staphylococcus	11	7.6%
Streptococcus	3	2.1%
E.coli	3	2.1%
Enterococcus fecalis	1	0.7%
All the above	26	18.1%
I don't know	100	69.4%
Total	**144**	**100%**

As Table 16 showed, majority of the respondents (69.4%, n= 100) responded that they do not know which type of Microorganisms exists on their mobiles. While only 7.6% of the students reported that Staphylococcus maybe exists on their mobiles, up to 18.1% (n= 26) of them think that all types of Microorganisms (Staphylococcus, Streptococcus, E.coli, Enterococcus fecalis, and Enterococcus fecalis) maybe exists on their mobiles.

Table 17: Ways of answering calls

Responses	n	%
By placing the mobile to my ear	68	47.2%
By putting the mobile on speaker	17	11.8%
By using blue tooth	19	13.2%
By using ear phones or ear plugs	40	27.8%
Total	**144**	**100%**

Slightly less than a half of the respondents (47.2%, n= 68) indicated that they placing the mobile to their ear when answering calls, followed by 27.8% (n=40) using earphones or earplugs.

Table 18: Responses regarding sharing mobile with others

Responses	n	%
Family members only	28	19.4%
Friends	18	12.5%
strangers at sometimes	6	4.2%
Never	92	63.9%
Total	**144**	**100%**

As the researchers expected, majority of the students never shared their mobile with others (63.9%, n= 92), while closed to one fifth of them (19.4%, n=28) reported that they share their mobiles with Family members only.

Assessment of students' Attitudes and behavior towards contaminated mobiles:

Table 19: Descriptive statistics for the scores of Attitudes and behavior towards contaminated mobiles (n=144)

Measure	value	Measure		value
N	144	Range		30
Mean	30.5	Minimum		16
Std. Error of Mean	0.52	Maximum		46
Median	31.0	Percentiles	25	27
Std. Deviation	6.18		50	31
Coefficient of Variation	20.3%		75	35

Source: SPSS Output Based on the Researchers own Survey, Jan. 2020.

Descriptive statistics for the total scores of Attitudes and behavior towards contaminated mobiles were calculated for the respondents detailed in the table 19 above. The 10 questions reported in the attitudes and behavior towards contaminated mobile section would result in a score of 10 as lowest score, while the best score of attitudes and behavior (the full mark) should be 52.

The minimum score was 16 and the maximum was 46 with range of 30, which indicates that there was a wide disparity between participants in their scores of attitudes and behavior towards contaminated mobiles. The mean of the score was 30.5 (S.E. = ± 0.52) with a median of 31.0, which indicates that the distribution of the scores is approximately symmetric. The standard deviation of the scores was 6.18, suggesting that the coefficient variation of the scores was 20.3%. Finally, the 75th percentile indicates that 75% of the participants in the survey made a total score of 35 or below attitudes and behavior towards contaminated mobiles and it means that only 25% scored above 35.

When categorized student's attitudes and behavior towards contaminated mobiles more than a half of the students (48.6%, n=70) had poor attitudes and behavior (p-value <0.01) with $(95\%\ CI, 40.4\% - 56.8\%)$, followed by 44 (30.6%) had moderate $(95\%\ CI, 23.1\% - 38.1\%)$, while the rest of the students (20.8%, n=30) had good attitudes and behavior towards contaminated mobiles$(95\%\ CI, 14.2\% - 27.4\%)$.

In addition to the above, when the researchers ran a T-test, no significant differences in means of the students' scores in knowledge and awareness were detected and attributed to gender or nationality (p-value > 0.05). Moreover, no significant differences in means of the students' scores in attitudes and behavior towards contaminated mobiles were detected and attributed to gender or nationality (p-value > 0.05).

DISCUSSION

Mobiles have become the comfort advanced technology of the society due to its diverse functionality and its pervasive low cost, which made it available to children and adults of all levels in the society **[22]**. In this study the mobile users were the young Kuwaiti female students, between the ages of 17-19 that possessed their first mobiles at their younger ages. It was noticed that the number of mobile users decreases, as their ages increase **[23].** 84% of the users owned a touch screen mobile that helps the exchange of microbial flora from the hands to the mobile surfaces **[23]**; contaminated surfaces transmit infectious organisms from inanimate to living objects and the opposite. The majorities of students keep their mobiles in their pockets, that induces contamination and serve as a reservoir for pathogens transmitting infections via hands **[24]**. One third of the students use their mobiles in the washroom (30.6%) for different reasons, one of which is answering the mobile, placing it on the ear, encouraging the transfer of microbial pathogens. Some well- educated families, householders don't wash hands after using the toilet or before drinking or eating **[33].** In this study, mobiles were used while dining by a (53.5%), making it a possibility of pathogen transfer by contamination. Slightly more than three quarters of students (76.4%) use their mobiles at bed time and place their mobiles near their bed by an 85.4%, moreover, near their head while sleeping (67.4%). Reported studies described the negative effect of technology use on sleep, well-being and health **[25, 26, 27]**. Other studies conducted on children and adolescent with the use of mobiles and sleep, described an adverse effect of technology use on sleep quality and sleep length **[26, 28, 29, 30, 31].** Slightly more than half of the students did not know if there were any germs on their mobiles, unaware of mobile contamination or transmission of pathogenic infections. The majority of the respondents (70.8%) did not wash hands after using their mobiles, which can lead to transmission of infection and health risks, especially when practicing in the labs, clinics and hospitals thus, carrying different pathogens and become an exogenous source of infections among patients and the surrounding population **[32]**. There was awareness among the students about physical and side effects of mobiles. Insufficient cleaning of mobiles and hands could spread agents responsible for communicable diseases. 78.5% of participants have mobile covers; hence, silicon covers could be easily disinfected with

chemical products, not damaging the cell phone itself **[34]**. From the results 63.9% did not share their mobiles with anyone and 19.4% shred them with members of the family, which reduces transmission of microbes. The students in general, shared both a poor attitude and poor behavior towards contaminated mobiles.

CONCLUSION AND RECOMMENDATIONS

Mobile phones are used frequently everywhere. Although, they are restricted in laboratories in Kuwait, but still are being used by some students. Therefore, they could be a cause for spreading infections throughout the community. Education and training programs should be provided to students on guidelines about restricting the use of these gadgets for safety reasons, in laboratories, clinics and hospitals especially when in contact with patients. Training the users how to clean and decontaminate mobiles by utilizing guidelines, brochures, posters, demonstration and practice. Screening of mobiles for bacterial contamination is highly recommended especially in hospitals. Ultrasonic cleaning of mobiles is one of the best ways to clean these gadgets thoroughly and safely **[35].** Raise the awareness about personal and hand hygiene that is an important measure in decreasing the possibility of cross- contamination and increase the awareness regarding pathogen transmission. Finally, use antimicrobial protection for mobiles (Microban technology) which is designed to provide Lucite acrylic surfaces to provide an added level of cleanliness on the surface of the acrylic and inhibit the growth of microorganisms **[**36**].**

Conflict of interest

None declared.

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Nil.

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