



Journal Homepage: -www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI:10.21474/IJAR01/1970
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/1970>



RESEARCH ARTICLE

STUDY CONCERNED THE COMMUNITY HEALTH BY ILLUSTRATION THE BEZEL BACTERIAL CONTAMINATION LOADS FOR THE MOBILE PHONES AND THE APPLICATION OF DAILY REGULAR HYGIENIC MEASURES, TAIF, KSA.

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Manuscript Info

Manuscript History

Received: 16 August 2016
 Final Accepted: 22 September 2016
 Published: October 2016

Key words:-

Mobile Phones, Spps, Staph. Spp, Coliforms Spp, Strept. Spp, Bacillus Spp, Hygienic Measures, Non-contaminated, Contaminated, Bacterial contamination.

Abstract

This search was on "The study concerned the community health by illustration the bezel bacterial contamination loads for the mobile phones and the application of daily regular hygienic measures, Taif, KSA". The whole mobile phones (MPs) under-study examined were bacterially contaminated 100%, were a consecutive increases every day until reached to 100% on the 6th day as follows: (6.2, 10.3, 17.1, 30.4, 55.1 and 100%) at (1st, 2nd, 3rd, 4th, 5th and 6th day) respectively. The differences among means between the days were increasing with the days as follows: (4.1, 6.8, 13.3, 24.7 and 44.9%) respectively. The most important bacterial Spps isolated were (Staph. Spp 82%, Coliforms Spp 53%, Strept. Spp 34% and Bacillus Spp 31%) respectively. The bacterial contamination for the MPs after once hygienic measures were: (non-contaminated : contaminated); (77.4% : 22.6%). The application of daily regular hygienic measures revealed the reduction in the bacterial contamination rate per day until reached to (0.0 and 0.2%) at the (start and end) of the 7th day, the days start after the de-contamination showed (0.2, 0.1, 0.1, 0.0, 0.0, 0.0 and 0.0) respectively, while the same days end were (3.1, 2.5, 2.0, 1.6, 1.2, 0.6 and 0.25) at (1st, 2nd, 3rd, 4th, 5th, 6th and 7th day) respectively. The difference between the days ends illustrated the extent of the sequential declines of the bacterial contamination were (0.6, 0.5, 0.4, 0.4, 0.4 and 0.4%) respectively. That concluded, the recommendation for the application of daily regular hygienic measures for MPs and hands should be encouraged for the prevention of the bacterial borne-infectious diseases in the community health.

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Introduction:-

The MPs:-

All persons owned MP as daily life [1-2] and social life, the persons handled frequently near to their body [3]. The KSA ranked the first MP used country in "The Arab World" [4]. The MP were harmful on the community health [5], contaminated via skin, the micro-organisms (MOs) colonized causing infectious diseases, that were the body flora, MP were a reservoirs of infected MOs and spread infections. The MP sharing persons were spread of MOs to the community [6], acted as good MOs carriers and spreaders [7]. The MP helped MOs to survive outside the body as from faecal sources [8], the present of pathogenic MOs indicated transmission from different sources [9]. The

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constant handling helped MOs for replication, reservoirs and spreading[10-11], increased the community borne-infectious diseases[11], turned as vectors of MOs transmitted[12] and harbors of various pathogenic MOs[13]. The MPs frequent contacted with hand turned as spreader of the infectious diseases[14], the non-cleaned MPs made as MOs reservoirs caused infections and harmed the community[15]. *Enterobacter aerogenes* indicated faecal contamination, *Bacillus subtilis* signed food spoilage[16]. The MPs unhealthy used were a good hosts of MOs[17].

The hands:-

The 25% hands of healthy people were a big sources and transmission of MOs[18], the hands-held were the way of MOs transmit from the MPs[1, 19], were a MOs vehicles holder from and to MPs[6, 20]. The many users of MPs did not take care of the personal hygienic measures and persons number handling of the same MPs, that made a good carriers of MOs[5]. The bacteria transmitted from hand to hand, frequent handling with different hygienic measures with skin, made the MOs contamination and community harms[16]. The MPs constant handling turned as MOs carriers especially with the skin which spread the MOs[15]. The contaminated hands spreading bacteria via person-to-person[17]. The MPs heat and MOs constant handling gave MOs media for replication of skin flora[21].

The isolated bacteria:-

At 1992, in Europ the isolated bacteria from the MPs were (*E. coli* and *Proteus mirabilis*)[22], at 2004, *Staph. epidermidis* isolated, was the body and tracts normal flora[10], during 2006, isolate was Coagulase Negative *Staph.* (CONS), [methicillin sensitive *Staph. aureus* (MSSA), methicillin resistant *Staph. aureus* (MRSA), *Coliforms*, *Enterococcus faecalis*, *Clostridium perfringens*, *Klebsiella Spp*, *Enterobacter Spp*, *Pseudomonas Spp*, *Aeromonas Spp*, and *Acinetobacter*], all were normal flora caused infectious diseases in the community[23]. At 2007, *Staph. epidermidis* isolated was the normal flora and tracts[24]. The main isolate at 2010 was *E. coli*, it was the 0.1% of the gut flora and caused illness[20], the main at 2011 *Staph. aureus* was 25% of healthy persons caused infections as MRSA[25], also during 2011, *Staph. epidermidis* isolated[26]. In Pakistan at 2012, the isolates were (*Staph.* 50%, *Strept. faecium* 34% *Bacillus cereus* 32%, *E. coli* 26% and *Micrococcus luteus* 10%)[27], at same year were (*E. coli*, *Pseudomonas Spp*, *Serratia Spp*, *Staph. aureus* and *Bacillus Spp*), caused infectious diseases in the community[15]. In India at 2015, isolates were (*Staph. aureus* and *epidermidis*), *Pseudomonas aeruginosa*, *Micrococcus luteus*, *Enterobacter aerogenes* and *Bacillus subtilis*)[16], at 2016, were (*Staph.*, *Klebsiella*, *Enterococcus*, *Bacillus*, *Acinetobacter*, *Corynebacterium*, *Pseudomonas*, *Proteus*, *Serratia*, and *E. coli Spp*)[28], also in the same year the contamination were 100% and isolates were (*Staph. aureus* and *epidermidis* 84%, *Bacillus Spp* 30%, *E. coli* 43% and *Proteus Spp* 11%). *Staph. epidermidis* was the first isolate via direct skin contact[29]. Also were (*Strept. Pyogenes*, *Staph. epidermidis* and *Klebsiella pneumoniae*), that an opportunistic bacteria causing illness[17]. In Dammam university, KSA, at 2010, (*Staph. aureus*, and *epidermidis*), *Pseudomonas aeruginosa*, *Neisseria sicca*, *Micrococcus luteus*, *Proteus mirabilis*, *Bacillus subtilis*, and *Enterobacter aerogenes*) were as ([56.58, 13.57], 8.01, 7.73, 6.51, 3.66, 2.85 and 1.09%)[19]. In Shaqra university, KSA, at 2012, the bacterial contamination was 80.9%, (*Staph. aureus* 79%, CONS 69%, *E. coli* and *Bacillus Spp* 54%), the 80% MPs contaminated were a source of the community disease[4]. In Taif University, KSA, at 2012, the bacterial contamination was 77.2% and isolates were *Staph. Spp*, *Bacillus Spp* and CONS 27.12%.[13]. At 2015 in Philippines, (*Staph.*, *Strept.*, *Klebsiella pneumonia*, *Micrococcus Spp*, *Pseudomonas*, *Listeria*, *Lactobacillus*, *Acinetobacter*, *Enterobacter*, *Bacillus*, *Citrobacter* and *Proteus*) were the normal flora and made severe infections in the community[32]. At 2016 in Britain, MPs touch screen had more *Staph. Spp* than other sites[33]. At 2016 in Canada, the MPs bacterial contaminated (9-15%) by pathogenic MOs[34], at 2016 in Iran, the MPs bacterial contaminated 98.9% by (*Staph. epidermidis* 63.9%, *E. coli* 12.3% and *Staph. aureus* 11.4%)[35].

The hygienic measures:-

The personal hygienic measures as hand washing and MPs swabbed prevented the borne-diseases[27]. The regular MPs de-contamination reduced the bacterial contamination (Allied Health Group)[17]. The hand washing and self-MPs were a good daily, also for MPs users with different hygienic measures habits and carefully for persons used the same MPs[15]. The hygienic measures varied with persons and gave different MOs types on the MPs[16]. The ethanol used as anti-bacterial of 62%[30], de-natured MOs proteins and dissolved lipids[31], used in industrial and base chemical for organic compounds[19]. The MPs wiped by 95% ethanol reduced 90% of the bacterial contamination. The MPs users might use the daily regular hygienic measures for the community healthy protection[15]. The de-contamination by 70% isopropyl alcohol as 71.3%, found 61.5% MPs contaminated as source of MOs caused illness[13]. At 2015 in Philippines, the 70% alcohol swabbed MPs before and after disinfection, it cleared the difference on aerobic plate count (APC) values before and after disinfection[32]. At 2016 in

Canada, they were practice a good hand hygienic measures which signed the MPs in high-risk areas and using 70% isopropyl alcohol to reduce the bacterial contamination[34].

The aim:-

This practice study was on the result of the Lab. experiment; The study concerned the community health by illustration the bezel bacterial contamination loads for the MPs and the application of daily regular hygienic measures to minimize: (bacterial contamination loads and borne-diseases), Taif, KSA, which as follows: The 1st goal was to elicit the suitable persons had (same age, habitat and scientific back ground). The 2nd goal was to illustrate the bezel bacterial contamination loads colonized for the MPs. The 3rd goal was on the isolation and identification of the bacterial contaminants. The 4th goal was on the application of once and daily regular hygienic measures to minimize: (bacterial contamination loads and borne-diseases). The 5th goal was on the evaluation of the MPs used the once and daily regular hygienic measures. The 6th goal was on the last it would be improved the MPs handling, the relation between the personal hygienic measures and MPs bacterial contamination, that had a relations concerned the community health were threat through MPs to clarify the relation between the personal hygienic measures and the community health. Finally concluded the daily regular hygienic measures for hands and MPs, that would be minimize bacterial contamination loads and borne-diseases.

Materials and Methods:-

The practical part of the this study planed was on "The study concerned the community health by illustration the bezel bacterial contamination loads for the MPs and the application of daily regular hygienic measures, Taif, KSA", so it consisted of several steps to get the results of Lab. experiment and composed as the follows:

The 1st step: The experiment preparation:-

- ❖ Some private MPs shops at Taif area were chosen, it was explained and clarify the purposes and the methods of Lab. experiment.
- ❖ The personal approvals of shops owners were gotten, that without any mention of the personal information.
- ❖ The deal of Lab. experiment were done on the new type of MPs with a touch screens.
- ❖ The MPs purchasers were selected, they had bought the same new type of MPs, similarly in (habits and scientific background) within level in age ranged of (20-40 years).
- ❖ The personal approvals were obtained from MPs purchasers without any mention of personal information[36].

The 2nd step: The normal MPs use:-

- ❖ The MPs purchasers agreed to be under-study of Lab. experiment were 31 in number.
- ❖ The MPs purchasers hands and their MPs were sanitized by the recent harmless sanitizer gel before the first use only as once, then let them use as a normal.
- ❖ The MPs samples collected for the bacteriological testing at the end of every day till the end of 7 days.
- ❖ The bacterial contamination illustrated by measuring the bezel turbidity and McFarland Stander Control (MSC), used Spectro-photo-meter at wavelength 450 nano-meter (nm)[37-40].
- ❖ The bacterial loads illustrated from the results by the application of the Equation Ratio (ER): ([Sample Reading/Fixed MSC Reading for 100%] X 100), that did for each sample and the means calculated[41].
- ❖ The bacterial types identified by Micro-Scan device[42].

The 3rd step: The normal MPs use with the once hygienic measures:-

- ❖ The MPs and hands were once sanitized and illustrated the bacterial contaminations and loads at the beginning of the day (after sanitization directly)[43-44].

The 4th step: The normal MPs use with the daily regular hygienic measures:

- ❖ The MPs and hands were daily regularly sanitized and illustrated the bacterial contaminations and loads at the beginning of the day (after sanitization directly) and at the end of the same day till the end of 7 days[43-44].
- ❖ Repeated the work in the line (3-5) of "The 2nd step: The normal MPs use"[37-41].

The 5th step: The data analysis:-

- ❖ Calculation of the means, analysis the data and appeared as a descriptive statistics in the tables and diagrams[45].

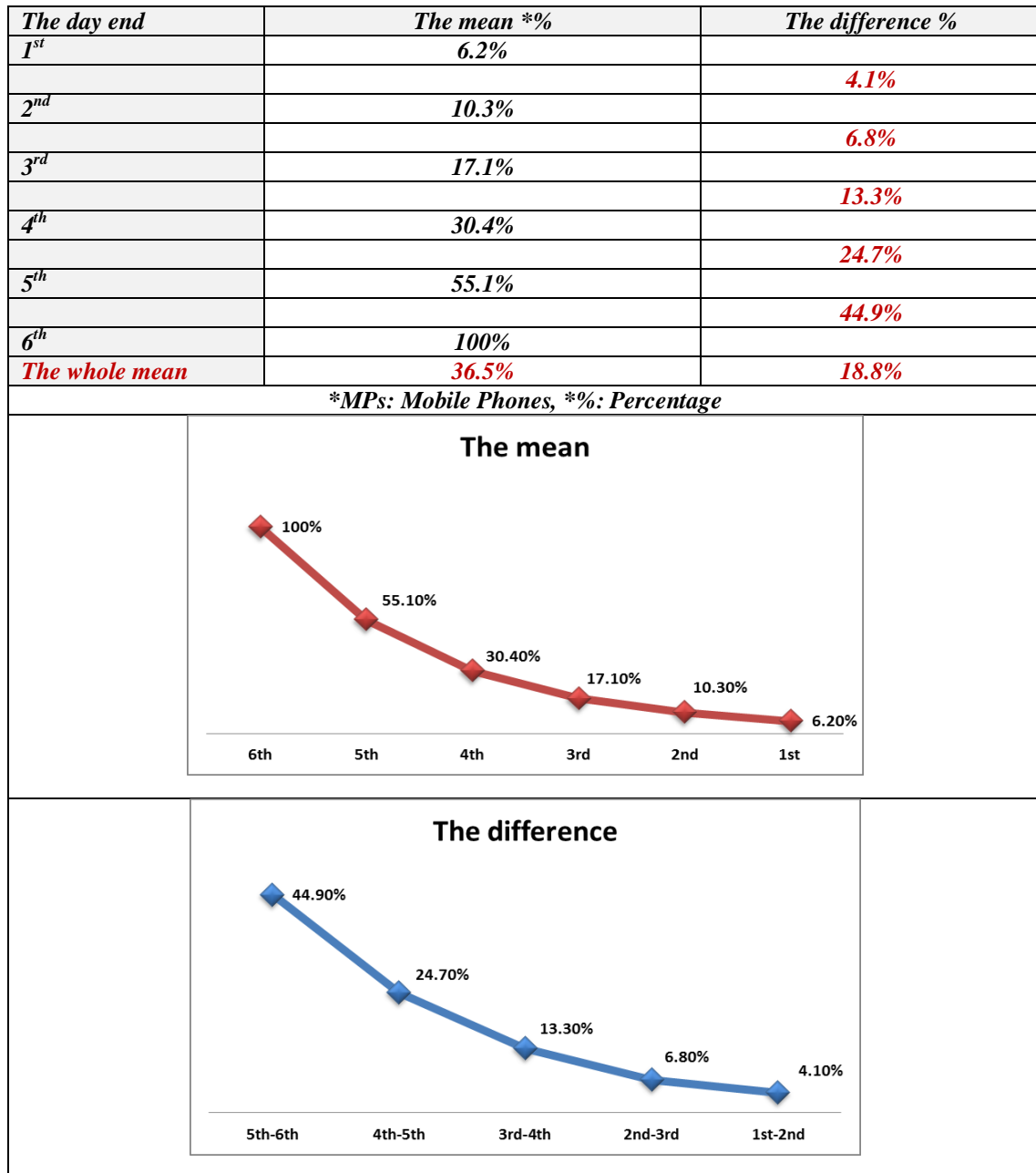
Results and Discussion:-*Table 1 and diagrams (1 and 2): The mean of the bezel bacterial contamination loads for the *MPs*

Table 1 and diagrams (1 and 2) showed the mean of the bezel bacterial contamination loads for the MPs, the whole MPs were bacterially contaminated as 100%. They were a consecutive increases every day until it reached to 100% at the 6th day as follows: (6.2, 10.3, 17.1, 30.4, 55.1 and 100%) at (1st, 2nd, 3rd, 4th, 5th and 6th day) respectively. That was the evidence of the bacterial contamination growing every day. The whole mean showed 36.5% for the mean loads percentages. The differences among means between the days were increasing with the days as follows: (4.1, 6.8, 13.3, 24.7 and 44.9%). That was the evidence of the bacterial serial multiplication and increased the bacterial contamination. The whole mean showed 18.8% for the differences percentages. It was clear that the bezel bacterial contamination loads for the MPs were growing daily up to 100%, that, the differences between the days indicated the increases which obvious the succession suggesting bacterial serial daily multiplication which provided the right accommodation.

The KSA ranked as the first MPs used country in the "Arab World"[4]. The MPs contaminated via skin, the MOs colonized causing infectious diseases, MPs were a reservoirs of infected MOs[6], it acted as good MOs carriers and spreading[7]. The MPs helped MOs to survive[8], the present of pathogenic MOs indicated transmission from different sources[9], a harbors of various pathogenic MOs[13]. The many users of MPs leaded a good carriers of MOs[5]. The MPs heat and constant handling replicated MOs was a skin flora[21]. At 2016, the bacterial contaminated 100%[29]. In Shaqra university, KSA, at 2012, the bacterial contaminated 80.9%[4]. In Taif University, KSA, at 2012, the bacterial contamination was 77.2%[13]. At 2016 in Iran, the MPs bacterial contaminated 98.9%[35].

Table 2 and diagram 3: The mean percentage of the main bacterial contamination loads *Spp isolated for the *MPs

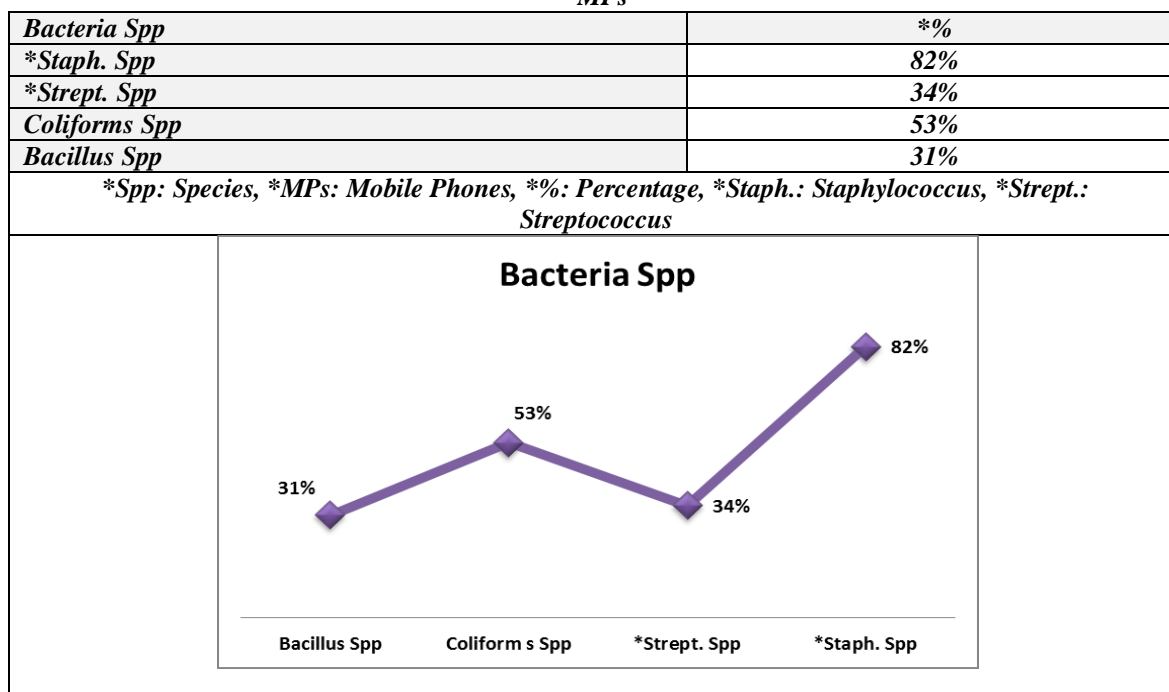


Table 2 and diagram 3 showed the mean percentage of the main bacterial contamination loads *Spp* isolated for the MPs, the most important *Spp* were *Staph. Spp* as 82%, followed by *Coliforms Spp* as 53%, then *Strept. Spp* as 34% and finally *Bacillus Spp* as 31%. All of isolated bacteria from the bezel bacterial contamination loads for the MPs represented a large part of the normal body flora which non-pathogenic, but when were passed the transition to the other peoples could be converted into a pathogenic bacteria, might borne-diseases and spread in the community.

In Dammam university, KSA, at 2010, were (*Staph. aureus*, and *epidermidis*), *Pseudomonas aeruginosa*, *Neisseria sicca*, *Micrococcus luteus*, *Proteus mirabilis*, *Bacillus subtilis*, and *Enterobacter aerogenes*) as ([56.58, 13.57], 8.01, 7.73, 6.51, 3.66, 2.85 and 1.09%)[19]. In Shaqra university, KSA, at 2012, were (*Staph. aureus* 79%, CONS 69%, *E. coli* and *Bacillus Spp* 54%), the MPs contaminated had a source of infectious diseases[4]. In Taif University, KSA, at 2012, the bacterial contamination isolates were *Staph. Spp*, *Bacillus Spp* and CONS 27.12%[13]. At 2016 in Iran, the MPs bacterial contaminated by (*Staph. epidermidis* 63.9%, *E. coli* 12.3% and *Staph. aureus* 11.4%)[35].

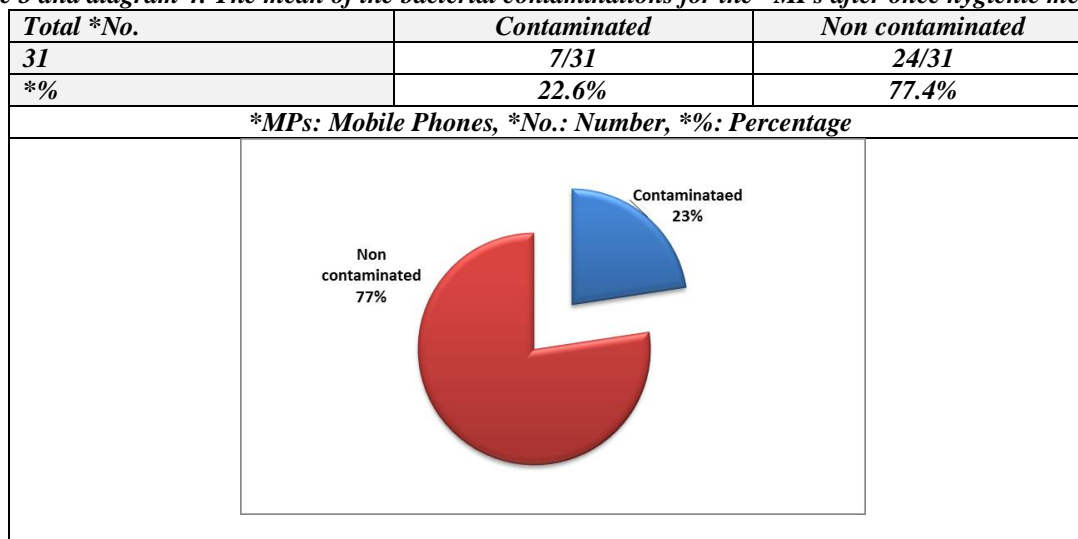
Table 3 and diagram 4: The mean of the bacterial contaminations for the *MPs after once hygienic measures

Table 3 and diagram 4 showed the mean of the bacterial contaminations for the MPs after once hygienic measures, the bacterial contamination of MPs under study were: (non-contaminated : contaminated); (77.4% : 22.6%). Although it was a once for the application of the hygienic measures, but it was strongly in the removing of the three quarters of the bacterial contamination for the MPs. From the above it illustrated the importance of the hygienic measures to reduce the contamination, multiplication and transmission of bacterial pathogens, it could borne-diseases which led to the events of the imbalance in the community health.

The personal hygienic measures as hand washing and MPs swabbed prevent borne-disease in the community[27]. The regular MPs de-contamination reduced the bacterial contamination (Allied Health Group)[17]. The hand washing and self-MPs were a good daily, that also for MPs users with different hygienic measures and carefully for persons used the same MPs[15]. The 62% ethanol used as anti-bacterial[30], it de-natured MOs proteins and dissolved lipids[31]. The MPs wiped by 95% ethanol reduced 90% of bacterial contamination[15], de-contamination by 70% isopropyl alcohol as 71.3%, found 61.5%[13]. The 70% alcohol swabbed MPs before and after disinfection, resulted the difference on APC values before and after disinfection[32]. It was a good practice hand hygienic measures which signed the MPs in high-risk areas and using 70% isopropyl alcohol to reduce the bacterial contamination and borne-diseases in the community[34].

Table 4 and diagrams (5 and 6): The mean of the bezel bacterial contamination loads for the *MPs and the application of daily regular hygienic measures.

The day	The day start after de-contamination	The same day end	The difference between the day end
Mean load *%			
1 st	0.2%	3.1%	
			0.6%
2 nd	0.1%	2.5%	
			0.5%
3 rd	0.1%	2.0%	
			0.4%
4 th	0.0%	1.6%	
			0.4%
5 th	0.0%	1.2%	
			0.4%
6 th	0.0%	0.6%	
			0.4%
7 th	0.0%	0.2%	
*MPs: Mobile Phones, *%: Percentage			

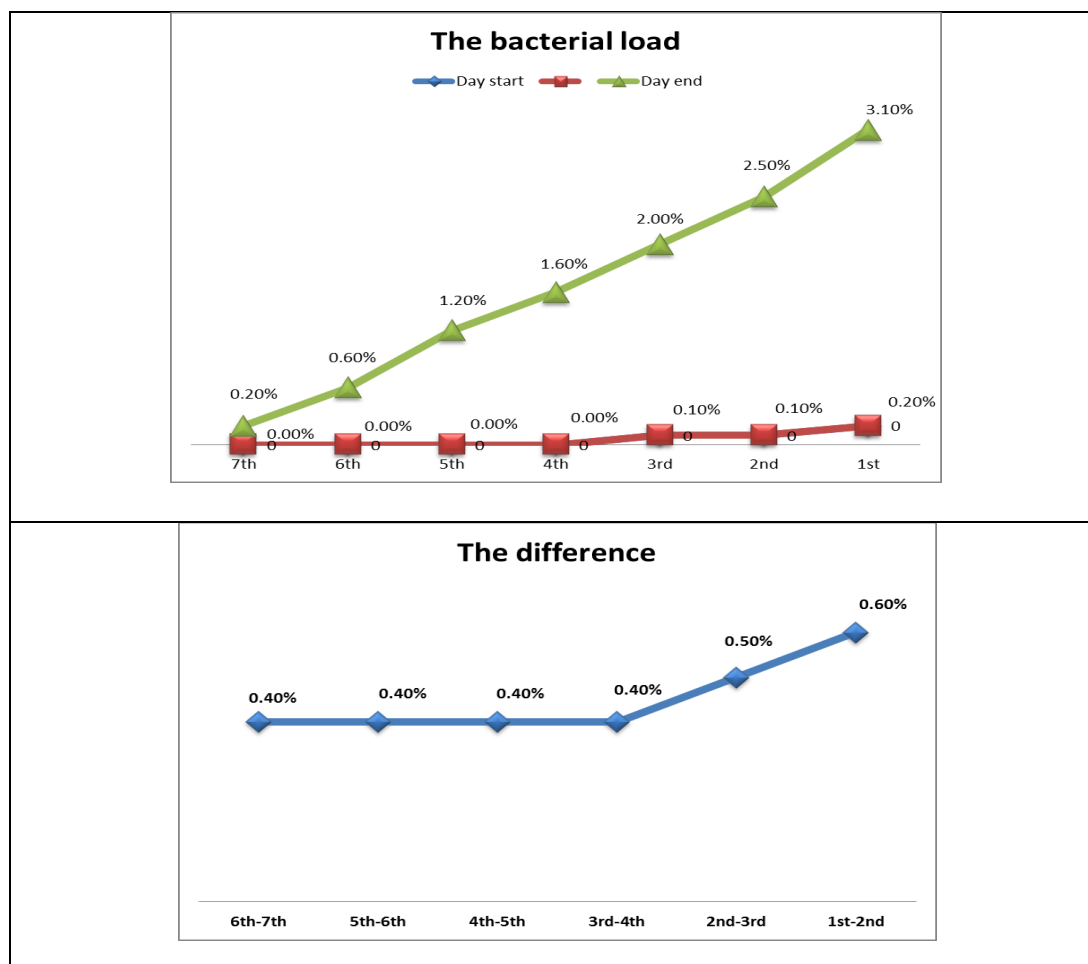


Table 4 and diagrams (5 and 6) showed the mean of the bezel bacterial contamination loads for the MPs and the application of daily regular hygienic measures, the result revealed the reduction in the bacterial contamination rate per day until it reached to (0.0 and 0.2%) at (the start and the end) of the 7th day, the days start after de-contamination showed (0.2, 0.1, 0.1, 0.0, 0.0, 0.0 and 0.0) respectively, while the same days end were (3.1, 2.5, 2.0, 1.6, 1.2, 0.6 and 0.25) at (1st, 2nd, 3rd, 4th, 5th, 6th and 7th day) respectively. The declination of the bacterial contamination for the MPs were obviously clear in the day start after de-contamination, but the declination were increased in the start day after de-contamination than the same days end, that was due to the use of MPs by their owners hands and transition of the body flora to the MPs. But overall there was a reduction in the bacterial contamination for MPs along the days of the week. The difference between the days end illustrated the extent of the sequential decline of bacterial contamination were as (0.6, 0.5, 0.4, 0.4, 0.4 and 0.4%) respectively. The use of daily regular hygienic measures for hands and MPs led to the lower bacterial contamination rate this indicated the importance to reduce the bacterial contamination for hands and MPs. Also showed the role to support the community health and reduce the transmission of bacterial etiology of the borne-diseases between individuals through the contaminated MPs. The personal hygienic measures as hand washing and MPs swabbed prevented borne-diseases in the community[27]. The regular MPs de-contamination reduced the bacterial contamination (Allied Health Group), which trained health-care professionals and MPs protection[17]. The hands washing and self-MPs were a good daily, that also for MPs users with different hygienic measures and carefully for persons used the same MPs[15]. The hygienic measures varied with persons and gave different MOs types on the MPs[16].

Conclusions:-

This search was on "The study concerned the community health by illustration the bezel bacterial contamination loads for the mobile phones and the application of daily regular hygienic measures, Taif, KSA". It was recommend for a good MPs handling, because could play a role in the spread of the bacterial infections and control the borne-

diseases in the community. It concerned the arrangements of daily regular hygienic measures that prevented the multiplication or transmission of bacterial pathogens from MPs that involved in the several infectious diseases in the community. The MPs were 100% bacterially contaminated with different *Spp* of bacteria which normally considered as a body flora, that might be turned to pathogenic agents and borne-infectious diseases in the community. Therefore, the application of daily regular hygienic measures of MPs and hands should be enhanced for the prevention of borne-diseases in the community and that could help in the community health protection.

Acknowledgments:-

All thanks sent to the MPs (shop owners and purchasers) for their kind co-operation, also all thanks sent to the Lab. Technicians for their support to the practical work section, the most thanks sent to the Journal accepted this paper for publication.

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