Adherence to Infection Prevention and Factors among Nurses in Jimma University Medical Center

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Abstract

Background: Adherence to infection prevention and control guidelines is critical to improving the quality of hospital care based on their efficacy in reducing the occurrence of infections that compromise patients' outcome. Nurses are front line of protecting themselves and clients from infectious disease. Nurses perform clinical procedures or other activities that can generate waste and expose themselves and clients to potentially infectious disease. This put nurses to be at higher risk for acquiring blood borne pathogens at health care facilities.

Objective: The main objective of this study was to assess the level of knowledge and practice on adherence of infection prevention and its associated factors among nurses in Jimma University medical center.

Method: Cross-sectional study design was conducted from April 1 to 10, 2016 and systematic sampling technique was used to select a total of 231 study subjects and data were collected using self-administered questionnaire and entered to Epi data manager and client analyzed using SPSS version 20 software and the analyzed data was presented using graphs, charts and tables were used to summarize and present major findings.

Result: The overall knowledge of nurses is 83.08%. Majority of the respondents 215 (83.08%) was knowledgeable regarding infection prevention and 16 (16.02%) was less knowledgeable. The overall practice of respondents were 61.08% and 148 (64.06%) of nurses has good practice but 83 (35.09%) has less practice.

Conclusion and recommendation: Majority of the respondents were knowledgeable regarding infection prevention principles. Although there were some gaps regarding infection prevention practice like washing hands in between patients, wearing of gloves when giving patient care, wearing of masks and goggles, recapping of used needles. The nurses were not strictly adhered to infection prevention practices due to insufficient supply of resources, working experience, negligence and shortage of time.

Keywords: Adherence; Infection prevention; Nurse

Introduction

Infection prevention practice is program of disease surveillance generally with in health care facilities designed to investigate, prevent and control the spread of infections and their causative micro-organism. Effective infection prevention and control is central to providing high quality health care for patients and a safe working environment for those that work in health care settings [1]. The standard guidelines for infection prevention include good hand hygiene, universal blood and body fluids precautions, cleansing and disinfection, sterilization of equipment/instruments, surfaces decontamination, correct use of disinfectants, aseptic techniques, safe disposal of wastes, sharps handling soiled linen and patient isolation [2].

Nosocomial infections have been recognized for hundred and fifty years, but they remain hazard to both health care workers and patients. Studies shows that poor decontamination of instrument and infection prevention practice and control often lead to outbreak of nosocomial infection. Nosocomial infections control is important for three main reasons: to prevent spread of infections from patient to health care workers and vice versa, to prevent bacterial resistance and to avoid wastage of financial resources [3].

A major reason for transmission of microorganisms is because of lack of personal hygiene in health care workers (HCWs) especially improper hand washing, disposal of sharp instruments and use of personal protective devices such as gloves and masks [4]. Hospital transmission of communicable diseases high prevalence of HIV, hepatitis B virus and hepatitis C virus and multi drug resistance TB, lack of resources for isolation and disinfection and wide spread drug resistance create major risk for health care related infections. Few data exists on the prevalence or impact of these infections in such environment. There is a need for interventions to reduce the burden of health care related infections and to set up effective surveillance program to determine their impact [5].

Health care associated infections (HAI) pose an ongoing and increasing challenge to hospitals in the clinical treatment of patients, infections of HCWs and patients and in the prevention of the cross transmission drug resistance pathogens [6]. In 2002 they caused 14.9 million deaths, accounting for 26% of total global mortality and also accounted for almost 30% of the total disability-adjusted life years (DALYs) lost worldwide. The proportion of all deaths due to infectious diseases is also highest in Africa, where more than 60% of all deaths are due to infectious or parasitic diseases (compared with only 5% in Europe) [7].

Lack of adherence to infection prevention is caused to drug resistance by microorganism, increase the time spent the patient in the hospital, further theses translate in to high cost the hospital and the

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patient as well as increase social suffering for the patient and family. HCAI's can lead to serious illness, long term disability and patient deaths [8].

The significance of this study was serve as a base line for other researchers, nurses, community workers, and police maker those who will interest to study on adherence to infection prevention practices and patient safety (IPPs). Another importance, it helps to generate new data on IPPs and increase compliance on standard precaution.

The aim of this study is to assess knowledge and practice on adherence to infection prevention and associated factor among nurses in Jimma University Medical center south west Ethiopia 2016.

Method and Materials

Study design, area and period

Facility based cross-sectional study design was employed; the study was conducted in Jimma University Medical Center from April 1 to 10, 2016. Jimma University Medical Center is one of the oldest public hospitals in the country. Geographically, it is located in Jimma city 352 km southwest of Addis Ababa. Currently it is the only teaching and referral hospital in the south-western part of the country, providing services for approximately 15000 inpatients, 160000 outpatient attendants, 11000 emergency cases, and 4500 deliveries in a year coming to the hospital from the catchment population of about 15 million people. It is a teaching hospital with a total capacity of about 450 beds.

Jimma University Medical Center is committed to reduce morbidity, mortality, disability and improve health status of the local people through providing a compressive package of high quality curative, preventive, promotive and rehabilitative health service to the public and providing clinical education to the next physicians, Nurses, Medical laboratory technologists, Pharmacists and other clinical and public health students in collaboration with respective stakeholders [9].

It has a total of 1448 servants from which 861 are technical staffs and the remaining 587 are supportive staffs. From the technical staffs 242 physicians, 497 nurses, 45 midwives, 53 pharmacist, 48 laboratory technologist, 7 psychiatric nurses, 5 ophthalmic nurses, 2 dental nurses, 8 radiographer and the remaining 4 are M.Sc. Nurses professionals.

Sample size determination

Sample size was determined using single population estimation formula with assumption of 95% confidence interval, 5% margin of error and considering the 50% proportion (since there was no previous study in the study setting). Considering non-response rate of 10%, final total sample sizes was 231 and Stratified simple random sampling technique was used to determine the study subjects. First the staff nurses were grouped according to their working unit then sampled population was proportionally assigned to each ward [10].

Inclusion and exclusion criteria

All Nurses who are served for six months or more in the hospitals at the time of the study and willing to participate was included and who were not available during data collection time due to Annual leave, maternal leave and sick leave were excluded.

Total number of nurses in Jimma University Medical Center (497) out of this 30 of them was excluded from the study because they are in annual leave, maternal and sick leave during the study periods [11].

Data collection instrument

Data collection instruments were developed after review of relevant literatures. The instruments were grouped and arranged according to the particular objectives that they can address. It is composed of socio-demographic questions, and related to enabling factors questions. The questioner was being prepared in English and translated to local language which is Amharic and Afan Oromo, then back translated to English questioner version by language expertise [12].

Data collection methods

For the sampled study participants' the purpose of the study and importance of participation was being informed and verbal consent was ensured. Data was collected through self-administered structured questionnaire [13].

Data quality control measures

Training was given for data collection facilitators on the objectives of the study, the contents of the questionnaire, issues related to the confidentiality of the responses and the rights of respondents.

The questionnaire was being pre-tested in Agaro district hospital which is 45 km from Jimma town on 10% (23) nurses, to assess the reliability of data collection instruments. Findings were being discussed among data collection facilitator so that, the tool was being modified before actual data collection and the final data collection was being conducted at convenient time by using of the modified questionnaire. The result of pretest was not included in the final research finding [14].

The collected data was being checked by principal investigator and data collection facilitators every day at the end of each data collection day and if necessary, corrective measures were being made for the area where difficulties identified [15].

Data processing, analysis and presentation

The collected data was being coded, sorted and entered using to Epidata manager and client and analyzed using descriptive parameters (SPSS version 20.0). The processed data were being interpreted and presented using simple frequency tables, text and graphs. Associations were also done and finally, variables with $P \leq 0.05$ were assumed to be statistically significant [16].

Operational definition

- Knowledgeable- when subjects answer ≥ mean (5 and more) of knowledge assessment questions correctly.

- Less knowledgeable- when subjects answer < mean (5 and less) of knowledge assessment questions.

- Good practice-when subjects answer mean > (6 and more) of practice assessment questions

- Poor practice-when subjects answer < mean (less than 6) of practice assessment questions.

- Hand washing-cleansing hands with soap and clean water before and after each procedure.

- Injection safety-putting used sharps and needles in a safety box immediately after use.

- Adherence-The degree to which an individual follow sate of guide line in a real life.

- Health care associated infections-any infection that arises as a result of health care.

- Nonsocial infection-hospital acquired infections

Ethical consideration

Ethical clearance and approval to conduct the research was obtained from Jimma University College of health science, Ethical Review Board. Then a letter was secured from the university to respective hospital management to gain support for the study. Prior to administering the questionnaires, the aims and objectives of the study were explained to the participants and informed consent was obtained. They were also told that participation is voluntarily and confidentiality and anonymity was ensured throughout the execution of the study as participants were not required to disclose personal information on the questionnaire. Anyone not willing to participate in the study would have full right

not to participate. All data collector facilitators and the research team used code numbers rather than names and kept the questionnaires locked and only accessed by principal investigator in order to ensure confidentiality [17].

Result

Socio demographic characteristics of nurses in Jimma University medical center April, 2016.

A total of 231 professional nurses were invited to participate in the study and among 231 nurses 130 (56%) and 101 (44%) were males and females respectively. The majority of them 114 (49%) were from 26-30 years, 87 (38%) from 21-25 years and 30 (13%) were 30 years and above. More than half 134 (58%) were married, and 97 (42%) single. Regarding educational status majority of them 154 (67%) diploma while (77) 33% has first degree (Table 1).

Knowledge of nurses in Jimma university medical center, april, 2016

The overall nurses' knowledge was 83.08%. The overall nurses' knowledge score regarding infection prevention was obtained from the table below by computing all the correct responses percentage and dividing it by total number of knowledge test questions maximum score Table 2 [18].

Practice and factors affect to infection prevention of nurses in Jimma university medical center, April, 2016

The table shows practice of nurse's on infection prevention in Jimma University Medical Center. The overall practice scores of our study subjects were 61.08% Of 231 nurses, 56 (24.4%) respondents wash their hands before and after patient care, and from those who did not always wash their hands before and after patient care 105 (60%) reported that there is no enough time for washing hands, and 70 (40%) reported that there is no adequate hand washing agents and water [19]. 133 (57.5%) of nurses says the container always disposed when three quarter is full and 98 (42.42%) say not always disposed when three quarter is full (Table 3).

S no	Variable	Characteristics	Frequency	Percent (%)
1	Sex	Male	130	56%
		Female	101	44%
2	Age	21-25	87	38%
		26-30	114	49%
		>30	30	13%
3	Marital status	Single	134	58%
		Married	97	42%
4	Religion	Orthodox	80	35%
		Muslim	74	32%
		Protestant	50	21%
		Other	27	12%
5	Ethnicity	Oromo	164	71%
		Amhara	36	15%
		Tigre	20	9%
		Other	11	5%
6	Educational status	Bachelor of science	77	33%
		Diploma	154	67%
7	Experience in years	1-4 year	80	35%
		5-10 year	131	57%
		Above 10 year	20	8%

Table 1: Show the Socio demographic characteristics of Nurses in Jimma University Medical center April, 2016.

S. No	Knowledge Questions	Response	Relative Frequency	Percent
1.	Disinfection prevents HAIS.	TRUE	213	92%
		FALSE	18	8%
2.	Standard precautions are applied to HIV positive patient only.	TRUE	223	96.5%
		FALSE	8	3.5%
3.	Chemical sterilization technique was used for every equipment.	TRUE	90	39%
		FALSE	141	61%
4	Physical sterilization (heat and radiation) technique was used for every equipment	TRUE	87	37.7%
		FALSE	144	62.3%
5.	All micro organisms including spores are destructed by autoclaving.	TRUE	211	91.4%
		FALSE	20	8.6%
6.	Equipments need decontamination before sterilization.	TRUE	219	94.8%
		FALSE	12	5.2%
7	Masks and goggles are not necessary if procedure and patient care activate are likely to cause flushing of blood or exposure to deep body flood.	TUE	39	16.8%
		FALSE	192	83.2%
8.	Used needle should be placed in puncture resistance container.	TRUE	197	85%
		FALSE	34	15%
9.	There is PEP (post exposure-prophylaxis)-for HIV after exposure.	TRUE	194	84%
		FALSE	37	16%
10.	Drug resistance micro organisms are restricted to health institution.	TRUE	45	19.4%
		FALSE	186	80.6

Table 2: Showed that the knowledge of Nurses in Jimma University Medical center, April, 2016.

Association of knowledge and socio demographic characteristics

The result indicates that 215 (93.07%) of nurses were knowledgeable (able to answer greater than 50% of knowledge questions) and 16 (6.03%) were less knowledgeable (able to answer less than 50% of knowledge question). From 215 knowledgeable nurses, 79 age's betweens 21-25,

No	Practice questions	Response	Relative frequency	Percent
1	Wash hands with soap and water before and after patient care	Always	56	24.4%
		Sometime	150	64.9%
		Never	25	10.8%
2	Wash hands immediately when you encountered unwanted contacted with blood fluids or contaminated items	Always	150	64.9%
		Sometime	81	35.01%
3	If your answer for q-2 not always, Reason for not always washing hands	1.Inadequatetime for washing hands	105	60%
		2. no adequate hand washing agents and water	70	40%
4	Wearing gloves when giving patient care	Always	190	82.25%
		Sometime	41	17.75%
		Never	11	4.7%
5	If your answer for question is not always ,are gloves not adequately available	Yes	35	85.36%
		No	26	14.64%
6	Dispose sharp materials in safety box.	Always	210	90.9
		Sometime	20	8.6
		NEVRE		
7	If your answer for Q-6 not always, is safety boxes not adequately available?	1.yes	15	75%
		2.NO	5	25%
8	Wear goggles to protect the eyes during procedure that generates spray of blood or body fluids.	Always	130	56.27%
		Sometime	70	30.30%
		Never	31	13.41%
9	If your answer is not always, are goggles not adequately available?	Yes	80	79.2%
		No	31	30.69%
10	Wear mask to protect nose and mouse	Always	148	64.06%
		Sometime	70	30.30%
		Never	13	5.6%
11	If your answer is not always, are masks not adequately available?	Yes	100	54.6%
		NO	83	45.4%
12	Recap used needle before disposing.	Always	150	64.9%
		Sometime	76	32.9%
		Never	5	2.1%
13	Put on protective device during collection and transportation of hospital waste.	Always	150	64.9%
		Sometime	70	30.3%
		Never	11	4.7%
14	Do you wear gown properly for every procedure?	Always	180	77.9%
		Sometime	51	22%
		Never		
15	Cover wounds or cuts on the skin before you start your work.	Always	140	60.6%
		Sometime	78	33.8%
		Never	13	5.6%
16	The containers available where needles or other sharps are used.	Always	187	80.9%
		Sometime	28	12.12%
		Never	16	6.9%
17	Containers emptied or disposed of when they are three quarters full.	Always	133	57.57%
		Sometime	70	30.30%
		Never	28	12.12%
18	Double gloves worn during surgery in deep body cavities or other procedures in which gloves rips or punctures are likely.	Always	55	23.8%
		Sometime	108	46.7%
		Never	68	29.4%
19	Infection prevention guidelines available in your working areas.	Yes	117	50.64%
		No	114	49.35%
20	Policies which encourage infection prevention in the hospital.	Yes	153	66.23%
		No	78	33.76%

Table 3: Shows the practice and factors affect to infection prevention of Nurses in Jimma University Medical center, April, 2016.

114 were 26-30 and 22 were greater than 30 year [20]. Of which 125 were male and 90 were female, 73 were Bachelors of Science and 142 were Diploma [21]. The table also show there is significant association between knowledge of nurses and their educational status, age, sex and year of experience (p<0.05). But has no significant association in knowledge and marital status (p>0.05) (Table 4).

Association of practice and demographic characteristics

A total of 20 (twenty) questions were asked to measure the practice of nurses on adherence to infection prevention. The result indicates 148 (64%) of nurses were good in Practice (able to answered >50% of Practice questions) and 83 (36%) of nurses have less practice(able to answer <50% of practice question). From 148 had good practice nurses, 57 of them were in the age range of 21-25, 81 of them in the age range 26-30 and 10 of them were in the age range of above 31. From those 90 were male and 57 were female, 51 were BSC and 97 were diploma [22-26].

The table also show have significant association between practice of nurses, age, experience and sex (p<0.05). But has no significant association in practice, educational status and marital status (p>0.05) (Table 5).

Percentage distribution of Knowledge of infection Prevention by Educational status of nurses in JUSH (Figure 1)

Percentage distribution of Knowledge of infection Prevention by sex of nurses in JUSH (Figure 2)

Percentage of knowledge distribution by experience of nurses in JUSH (Figure 3)

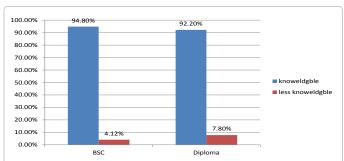Percentage distribution of infection prevention practice by educational (Figure 4)

Figure 1: The flowchart of study selection based on the inclusion and exclusion criteria.
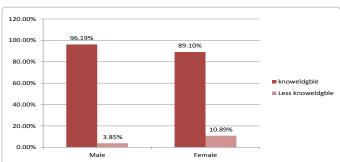

Figure 2: multiple bar graphs showing the percentage of knowledge distribution by sex of Nurses in Jimma University Medical center, April, 2016.

No	Variable		Knowledgeable	Percent	Less knowledgeable	Percent (%)	Total	Chi	p-value
1	Age	21-25	79	90.8%	8	9.2%	87	27.13	0.00001
		26-30	114	100%			114		
		>30	22	73.3%	8	26.6%	30		
2	Sex	M	125	96.15%	5	3.85%	130	4.38	0.0364
		F	90	89.1%	11	10.9%	101		
3	Marital Status	Single	120	89.5%	14	10.5%	134	6.138	0.464
		Married	95	97.9%	2	2.1%	97		
4	Educational Status	BSC	73	94.8%	4	5.2%	77	0.5372	0.01323
		Diploma	142	92.2%	12	7.8%	154		
5	Experience	1-4	70	87.5%	10	12.5%	80	7.19	0.027376
		5-10	127	96.9%	4	3.1%	131		
		>10	18	90%	2	10%	20		

Table 4: Shows association of knowledge and socio demographic characteristics of nurses in jimma university Medical Center on infection prevention in, April 2016.

NO	Variable		Good practice	Percent	Less practice	Percent	Total	X^2	p-value
1	Age	21-25	57	65.5%	30	34.5%	87	14.8	0.00061
		26-30	81	71%	33	28.9%	114		
		>30	10	66.6%	20	66.6%	30		
2	Sex	M	90	69.23	40	30.7%	130	4.02	0.045
		F	58	56.43%	43	43.56%	101		
3	Marital Status	Single	81	60.44%	53	39.6%	134	1.82	0.18
		Married	67	69.07%	30	30.9%	97		
4	Education	BSC	51	66.23%	26	33.8%	77	0.23	0.62
		Diploma	97	62.9%	57	37.01%	154		
5	Experience	1-4	60	75%	20	44.27%	80	9.152	0.010295
		5-10	73	59.6%	58	44.27%	131		
		>10	15	75%	5	25%	20		

Table 5: Shows practice-socio demographic data association of Nurses in Jimma University Medical center, on infection prevention April, 2016.
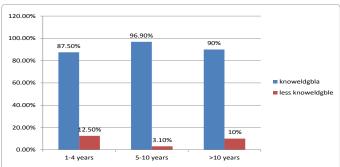
Figure 3: Multiple bar graphs showing the percentage of knowledge distribution by experience of Nurses in Jimma University Medical center, April, 2016.
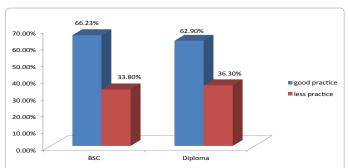

Figure 4: Multiple bar graphs showing the percentage of practice – educational status of Nurses in Jimma University Medical center, April, 2016.
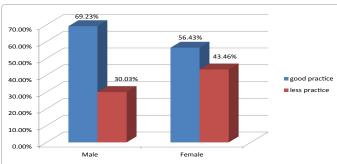

Figure 5: Multiply bar graphs showing the percentage of practice of nurses by sex in Jimma University Medical center, April, 2016.
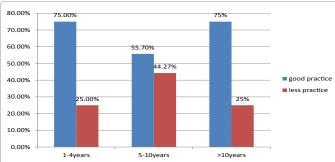

Figure 6: Multiply bar graphs showing the percentage of practice of nurses by experience in Jimma University Medical center, April, 2016.

Percentage distribution of infection prevention practice by sex (Figure 5)

Percentage of practice distribution by experience of nurses in JUMC (Figure 6)

Discussion

This study assessed important information regarding knowledge and practice of nurses about infection prevention and its factors in Jimma University Medical Center.

Majority of the respondents, 215 (94.78%) were knowledgeable regarding infection prevention. Nurses whose age is in between 21-25 were 3 times higher in knowledge than 31 years old. Being BSC health care professionals was 1.5 times higher knowledgeable than being diploma health care workers. The overall knowledge of our study was 83% is higher when compared to the study conducted to assess the knowledge, attitude and practice of infection prevention among health care workers in Bahir Dar city administration health institutions (overall knowledge scores of 80%) [27]. But it lower when compared to the study conduct in Kenya (overall knowledge score of 90.38%) [28].

The overall practice scores of our study subjects were 61.08% Nurses whose age range in between 21-25 were 0.78 times less practiced infection prevention than those who were in the age range 26-30 but 3 times greater practicing infection prevention than those whose age were above 31. Our finding is better when compared to a study conducted on the standard precaution practice among HCW$_s$ in public health facilities of Mekele Specialized Zone (over all practice score of 42.9%) and less compared to a study conducted in North West bank district (overall practice score was 80%). The reason may be because of hospital facilities.

Of 231 nurses, 56 (24.4%%) respondents wash their hands before and after patient care, and from those who did not always wash their hands before and after patient care (105 or 60%), reported that there is no enough time for washing hands, and 70 (40%) reported that there is no adequate hand washing agents and water. Our result is not comparable to the result of the study conducted to assess the observance of universal precautions (Ups) by HCWs in Abeokuta, Ogum state, Nigeria which was 94.6% of nurse's hand washing after handing patient [27]. Also the study conducted in china shows noncompliance in hand Hygiene was 40% (24).

From 231 nurses, 148 (64.08) always use mask and from those who did not use mask always 100 (54.6%) reported that has shortage of mask and 83 (45.5%) has no reason. our finding is better when compared the study conduct in four district hospital of Kenya which is (55.6%) of nurses not use mask always.

Of 231 nurses 190 (82.25%) always put-on gloves when giving patient care, 41 (17.75%) reported not always put on gloves when giving patient care. From 41 nurses who didn`t always put on gloves, 20 (48%) reported that gloves were not adequately available and 21 have no reason. Our result is good when compared with the result of the study conducted in Anhui china which was 61% (24) of nurses not always put on gloves when give patient care.

The result shows 117 (50.6%) of nurses says has no infection prevention guidelines, 78 (33.78) says has no police which encourage infection prevention, 98 (42.42) says containers not always empathized when three fourth is full, 70 (40%) says has shortage of water and 105(60%) says has in adequate time to wash hands between patient care.

Conclusion and Recommendation

Conclusion

Majority of the respondents were knowledgeable regarding infection prevention principles. The overall knowledge was 83% and the overall

practice is 61.08%. Although there were some gaps regarding infection prevention practice like washing hands in between patients, wearing of Gloves when giving patient care, wearing of masks and goggles, recapping of used needles, cover wound before give patient care. The nurses were not strictly adhered to infection prevention practices due to insufficient supply of resources like (water, mask, goggle, working experience, negligence and shortage of time).

Recommendation

Based on our findings we recommend the following

- Nurses should get continuous training regarding infection prevention.

- There should be adequate supply of resources (masks, goggles, hand washing agents).

- Nurses should use their knowledge in practice.

- There should have infection prevention guide line and police.

Possible limitations of the study : The finding of this study is limited to teaching hospital/medical center. Therefore the finding may not be generalized to nurses working at health centers, district hospitals and referral hospitals. There is also limitation of literature on this topic in our country because of this reason comparison of the results was done with other countries where the health institutions setup, health policy and other factors are quite different. Since it is organizational research there is also social or cultural desirable bias.

Acknowledgement

Authors' Contributions

Mr. Gashaw Akele wrote the proposal, participated in data collection, analyzed the data and drafted the paper, Mr. Ibrahim Yimam, and Mr. Israel Bekele approved the proposal, participated in data analysis and revised subsequent draft of the paper. All authors read and approved the final manuscript.

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