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Nurses' use of universal precautions

Robin G.S. Jackson
Edith Cowan University

Edith Cowan University

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NURSES' USE OF UNIVERSAL PRECAUTIONS

BY

ROBIN G.S. JACKSON R.N.

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ABSTRACT

Research into Acquired Immune Deficiency Syndrome, Hepatitis B., and other bloodborne pathogens has led to the current worldwide awareness that patients can be admitted to hospitals with potentially fatal diseases that can remain undetected in blood and certain body fluids. This has resulted in a change of emphasis in Infection Control, namely isolating the source of infection rather than isolating the diagnosed infectious patient. One such technique recommended to protect health care workers, and other patients from nosocomial disease, is Universal Precautions. This study, using a descriptive survey design and structured questionnaire examined nurses' stated compliance to this technique in a suburban, non-teaching hospital of over 100 beds. The 77 subjects, who volunteered to complete a questionnaire, were all currently involved in direct patient care. Nursing staff working in the General Geriatric Ward, Psycho-Geriatric Ward, General Surgical/Medical Ward, Maternity Ward, and Operating Rooms were invited to take part in the study. The data collection took place over a one week period by the investigator personally taking the questionnaires to the wards. The analysis of the data, using a Statistical Analysis System, showed that even though the level of knowledge and opinion level were positive, the stated practice of Universal Precautions was low. The range of correlations was so small that the planned multiple regression was only carried out for one variable, knowledge, the result of which was $F(1,75)=1.38$, $P<.24$., which was not significant. The results of one-way analysis of variance computed for stated practice by experience, level designation, and area of work were not

significant. This study revealed that though nurses may have a reasonable level of knowledge, and a positive opinion towards Universal Precautions, the Stated Practice may be low regardless of the years of experience, level of employment or area of work. Research needs to be continued to further examine what other factors may be influencing the lack of stated compliance by nurses' to Universal Precautions, a recommended technique of nosocomial disease protection.

DECLARATION

"I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text".

SIGNATURE: 

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INTRODUCTION

Background and Purpose

During the last decade there has been a worldwide increase of incidence of bloodborne viral infections. The presence of Acquired Immune Deficiency Syndrome (AIDS), Hepatitis B., and other bloodborne pathogens is now recognised in most communities. Research into such infections has led to the current awareness that patients may be admitted to hospitals with a potentially fatal disease that can remain undetected in blood and certain body fluids.

The condition commonly referred to as AIDS was first identified in the United States in 1981. Since then cases have been reported in all parts of the world. With further study, AIDS was found to be caused by a virus, Human Immunodeficiency Virus (HIV), that can remain undetected in blood and certain body fluids. This disease, combined with Hepatitis B and other bloodborne pathogens in health care settings, has caused a change in cross infection policy throughout the world. One impact has been on health care workers and methods to prevent nosocomial (hospital acquired) disease. The result has been the development of Universal Precautions or Universal Blood and Body Fluid Precautions and Body Substance Isolation.

The policy change in cross infection has resulted in a shift of emphasis in cross infection control, which is to isolate the source of the infection rather than relying on a diagnosis and isolating the infectious patient. The potential source of infection in bloodborne infections is blood and certain body fluids. To isolate these substances in all patients is known as Universal Precautions.

The situation exists that patients with undiagnosed, potentially fatal infections can be admitted to hospital creating a health hazard to health care workers and other patients. The purpose of this study is to examine to what degree nurses follow recommended techniques of preventing cross infection.

Problem Statement and Question for Study

The incidence of bloodborne infections, particularly AIDS, is increasing in the community. The World Health Organisation predicts that by the end of the 1990s the number of AIDS cases will rise to six million (Nornhold, 1990). Though most new cases will be in the Third World countries, other countries will correspondingly experience an increase of AIDS cases. It therefore follows that the percentage of patients admitted to hospital with undiagnosed potentially fatal diseases will also increase. Logically the risk factor to health care providers must increase with the increasing incidence within the community. Though the risk to health care workers is considered to be small it does exist as a personal health hazard. In Sydney three doctors and three nurses have been placed on a course of the antiviral drug AZT following "significant exposure" to HIV positive body substances from infected

patients while at work. The Royal Prince Alfred Hospital in Sydney has recently introduced a policy of offering prophylactic AZT to all staff who have experienced "significant exposure" to HIV within 72 hours of exposure. AZT is a very expensive drug, a six week course costs $1043, and though its effect on slowing down, and perhaps preventing Aids is shown in animal experiments, there is no conclusion about its effectiveness in human beings (Hicks, 1990). The risk exists, and the fact that a hospital has offered AZT to its staff, in this manner, demonstrates the level of concern by authorities in one hospital in Australia.

Most hospitals provide Hepatitis B vaccination for nurses as part of the staff protection polices, but to date there is no vaccine available for protection against other bloodborne pathogens such as AIDS. The lack of proof of the effectiveness, and the expense involved, rules out the possibility of using AZT as a prophylactic drug to protect health care workers from AIDS.

Nurses are at times exposed to patients' blood and body fluids and it is not practical, nor is it possible to screen all patients for bloodborne infections prior to admission to hospital. Though some health care workers are of the opinion that it is essential for hospital staff to know the HIV status of the patient, for reasons of ethics, protection of people's privacy, and to prevent discrimination, mandatory screening of patients is not recommended by AIDS policy advisors (AIDS prevention and control, 1988). In regard to accident and emergency admissions it is not possible to ascertain the HIV status of the patient prior to admission. At present

the tests that are available to establish HIV status can, for various reasons, give a false positive or false negative result.

The only remaining means of protecting hospital staff against potentially fatal diseases is the use of recommended cross infection polices, to isolate the source of infection. It is therefore important to examine to what degree nurses follow the recommended cross infection policy change of isolating blood and certain body fluids of all patients.

As part of the worldwide movement to promote safety amongst health professionals, the hospital participating in the study, over a year ago, introduced Universal Precautions. This study was undertaken to ascertain the stated compliance of nurses, involved in direct patient contact in most areas of the hospital, to the principles of Universal Precautions.

Specifically the following research question was posed: What is the level of nurses' stated practice to Universal Precaution principles?

Definitions

The terms Universal Precautions and Body Substance Isolation are often used interchangeably which can be confusing. Under Universal Precautions, blood and certain body fluids of all patients are considered potentially infectious. Body Substance Isolation considers all moist body substances of all patients as potentially

infectious.

The Centres for Disease Control (C.D.C.), Atlanta, Georgia made the following recommendations for Universal Precautions (Cook 1988):-

Body Fluids to Which Universal Precautions Apply

- blood
- semen
- vaginal secretions
- tissues
- cerebrospinal fluid
- synovial fluid
- pleural fluid
- peritoneal fluid
- pericardial fluid
- amniotic fluid, and
- other body fluids containing visible blood

Body Fluids to Which Universal Precautions Do Not Apply

- faeces
- nasal secretions
- sputum
- sweat

- tears
- urine
- vomitus

The concept of Body Substance Isolation can be described as:–

Body Substance Isolation

- body fluids
- body tissues
- excreta

Hospitals have developed their cross infection policies between Universal Precautions, as recommended by the C.D.C., and the total coverage of Body Substance Isolation.

For the purpose of this study, Universal Precautions shall be defined as described by the hospital involved in the study. That is, to add faeces and urine to the CDC list of body fluids to which Universal Precautions apply.

Body Fluids to Which Universal Precautions Apply:

- blood
- faeces
- urine
- vaginal secretions
- semen

- body tissue
- cerebrospinal fluid
- synovial fluid
- pleural fluid
- peritoneal fluid
- pericardial fluid
- amniotic fluids
- other body fluids containing blood

The major variables studied were knowledge of Universal Precautions, opinion of cross infection principles, hospital area of work, length of experience, level designation, and stated practice.

Definitions of Major Variables

Independent:

1. Knowledge – what nurses know about Universal Precautions based on the Hospital's policy on infection control.
2. Opinion – what nurses believe/think about cross infection principles.
3. Area of work – high, moderate, and low risk area according to the assumed exposure risk level of the unit the nurse is working in currently.
4. Experience – how long the nurse has been involved in direct patient care.

5. Level designation – current level of employment category of position held.

Dependent: Stated practice – the nurse's stated action in carrying out Universal Precautions.

Specific Study Objectives

The specific study objectives were to determine:–

1. If practice as stated by nurses reflects Universal Precaution principles;
2. The effects of knowledge on stated practice;
3. The effect of opinion on stated practice;
4. The effect of the area of work on stated practice;
5. The effect of experience on stated practice.
6. The effect of level designation on stated practice.

REVIEW OF LITERATURE

The Impact of AIDS on Cross Infection Policy

Since the identification of AIDS, various means of communication have been used to distribute information about the disease. Included in this have been books written on all aspects of the condition. Often included in the books is a section on the history and spread of AIDS. One editor covers this under the heading 'Development of the Epidemic' (Alder 1988), which is how most authors view the

AIDS phenomenon. In fact some have likened it to a 20th century outbreak of the "black plague".

A point made by Brass and Gold (1985) is that despite the discovery of the causative virus little else is really known about AIDS as a disease process, including detailed knowledge on aspects of the transmission from one person to another. There is now no known cure, and discussion in the literature includes means of self protection against the infection such as safe sex practices and once only use of sterile needles by intravenous drug users (Adler, 1988; Brass and Gold, 1985; Connor and Kingman, 1988). In regard to transmission of the disease to health care workers, or other patients, little is written in books. Connor and Kingman (1988) say "Health-care workers do, of course, have to take special care when handling blood which may be infectious" (p. 13). Brass and Gold (1985) make the point that "The evidence on health workers catching the virus is still very contradictory" (p. 144), but later state "To be as secure as possible, any health workers who have contact in their work with members of the general public should take extra care not to expose themselves to potentially virus-carrying body fluids" (p. 145).

So in the literature on AIDS, where is the evidence that it was indeed the advent of the AIDS epidemic that led to the development of Universal Precautions as a recommended method of protecting health care workers? This development is so recent that at present written evidence is found only in Government Policy

Publications and Journal Articles.

The impact that identification of AIDS, and the discovery of its causative virus, HIV, have had on isolation nursing and cross infection techniques, can best be seen in the following quote from Morbidity and Mortality Weekly Report (1988):

> "In 1983, CDC published a document entitled 'Guideline for Isolation Precautions in Hospitals'...The recommendations in this section called for blood and body fluid precautions when a patient was known or suspected to be infected with bloodborne pathogens. In August 1987, CDC published a document entitled 'Recommendations for Prevention of HIV Transmission in Health-Care Settings'. In contrast to the 1983 document, the 1987 document recommended that blood and body fluids precautions be consistently used for all patients regardless of their bloodborne infection status. This extension of blood and body fluid precautions to ALL patients is referred to as 'Universal Blood and Body Fluid Precautions' or 'Universal Precautions'. Under Universal Precautions, blood and certain body fluids of all patients are considered potentially infectious for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and other bloodborne pathogens." (p. 36)

Up until this time only known infectious patients had been nursed with special precautions such as isolation nursing. It is now recognised that it is the unknown infection the patient may have that is the potential hazard. What infection control experts are now saying is that all patients should be viewed as potentially infectious.

Concern of Society and Age Groups Involved

A measure of concern by society about this condition can be judged by the fact that

most western governments have published updated information and policies in regard to all aspects of AIDS. In Australia such papers support the CDC Universal Precautions as a means of infection control. Aids: A Time to Care, A Time to Act (1988), National HIV/AIDS Strategy (1989).

A high exposure to blood and body fluids not only occurs for health care workers in Operating Rooms and Accident and Emergency Departments, but also in Delivery Suites and Maternity units. Heterosexual spread of AIDS to women is increasing, and most women who are infected are of child bearing age. Fekety (1989), a midwife, states: "As the epidemic expands worldwide, greater proportions of our clients will be at risk, and the heterosexually infected women and perinatally infected baby will be encounted with increasing frequency until the spread of the disease can be curtailed" (p. 257). According to Zeidenstein (1989), the reality of AIDS is also causing a return to midwives using gowns, glasses, masks and gloves, a practice that many discarded in the 1960s - 1970s.

At the other end of the age scale, health care workers involved in gerontological nursing are beginning to become aware that older adults may be HIV positive, and be infected with AIDS. At present little is known about AIDS infection in the elderly. The CDC weekly surveillance reports group all people over the age of 49 together, so there is no way of knowing the incidence of AIDS in people over 65 (Whipple, 1989).

Not all people who are HIV positive present with the signs and symptoms of AIDS. People who are HIV positive have an increased incidence of neurological abnormalities and it is possible that people who are diagnosed as having dementia, organic brain syndrome, or Alzheimer's disease may be HIV infected (Mirra, Anand, and Spira, cited in Whipple, 1989).

It is becoming increasingly apparent that health care workers have need for some form of self protection when providing care for others, regardless of the age of the patient.

Universal Precautions Versus Body Substance Isolation Techniques

The concept of Body Substance Isolation was proposed by Lynch, Jackson, Cummings, and Stamm (1987). This consisted of the use of barrier precautions (gloves, plastic aprons etc) when health care workers are exposed to the patient's moist body substances, mucous membranes, and nonintact skin. Hollik (1989) in comparing this to Universal Precautions says this method "emphasizes protection of patient to patient cross infection in addition to protection of the employee", but further states:- "Strict adherence to Body Substance Isolation, in many respects represents an overkill approach to Infection Control" (p 77).

Relevant Studies

One criticism of both Universal Precautions and Body Substance Isolation techniques has been that in an emergency situation, staff don't have time to put on protective gloves and aprons. Kelen, Di Giovanna, Bisson, Kalainov, Sivertson, and Quinn (1989) in a study involving an emergency department, found health providers followed Universal Precautions during 44% of interventions. In patients with profuse bleedings, adherence fell to 19.5% The most common reasons given by providers for not following precautions were insufficient time to put on protective attire and interference with procedural skills.

Another study done by Baroff and Talan (1989), also in an emergency department, concluded that there is currently a low rate of compliance with Universal Precautions polices by emergency department personnel.

Another comment has been made that some staff go from patient to patient using the same pair of gloves (Valenti, 1988). For the present though it remains a fact that health-care workers and other patients require protection from nosocomial disease and the use of Universal Precautions or Body Substance Isolation is the most effective way to date.

The literature reviewed establishes that bloodborne infections are a worldwide problem, and the AIDS epidemic is in progress. Regardless of the age of the patient or area of work health care workers need to be aware of the resulting

changes in cross infection policy and need to take care in protecting themselves by implementing recommended methods of Universal Precautions. The development and rationale for the use of Universal Precautions is well supported, but evidence of the actual use of Universal Precautions is lacking, other than the low standard of use in emergency departments.

METHODS

Population and Sample

The population for the pilot study was Registered Nurses currently employed by the School of Nursing at the Western Australian College of Advanced Education. The 10 who volunteered to take part in the pilot study were all currently involved in clinical practice in similar areas as the areas used in the study.

The population was the nursing staff employed at a suburban, non-teaching hospital of over 100 beds in Perth, Western Australia. All nursing staff working at the time of the data collection were invited to take part. The study sample consisted of nurses from the General Geriatric Ward, Psycho Geriatric Ward, General Surgical/Medical Ward, Maternity Ward and Operating Rooms.

All full-time and permanent part-time nurses involved in direct 'hands-on' delivery of care, and not on leave, were invited to take part in the study. This included all Registered Nurses from level one, all Clinical Nurses from levels two and three, and

all Enrolled Nurses. Agency and casual part-time staff were not included.

Design and Instrumentation

A descriptive survey design was used in this study, and data were collected by means of a structured questionnaire.

The questionnaire (Appendix A) was used in this study as a means to measure three of the variables, stated practice, opinion about cross infection principles and knowledge about Universal Precautions. The data for the remaining three variables, area of work, experience and level designation were obtained from the demographic data form (Appendix B).

A search of the Medline data base, forward from 1984, and books which list instruments used in nursing research, failed to find a suitable tool for data collection. The only tool was mentioned in an abstract of a conference report. This was subsequently obtained from Docken, one of the authors.

The instrument designed by Docken, Beiningen, and Vander Woude (1989) was developed to monitor compliance with Body Substance Isolation, following its implementation in a 499-bed acute care hospital. The instrument they used covered three sections, practices, opinion, and knowledge. They determined it was better to ascertain the compliance of their personnel based not only on stated practices, but also on opinion and knowledge of the Body Substance Isolation policy. They further stated that observational monitoring is difficult, in that individual judgement and

skills in this area cannot be evaluated by simply observing. Also practices may be skewed, they stated, because of the presence of observers. The instrument used in this study was drawn from the instrument they used.

The concept of using the three sections, stated practice, opinion, and knowledge, was retained. The format of stated practice was changed to a scenario with a choice of stated action. Opinion was changed to a bi-polar graphic scale. Multi-choice knowledge questions were checked against the literature about Universal Precautions as defined by the hospital used in the study. Adjustments were then made accordingly.

To establish the level of content validity, a validity assessment by three content specialists was carried out as described by Waltz, Strickland, and Lenz (1983, p. 196). They state an index of +1.00 will occur when perfect positive item-objective congruence exists, that is, when content specialists assign a +1 to the item for its relevance to the stated objective, and a -1 to those items which do not fit the objective.

Three content specialists rated items on the objective set. The items tested were all the questions from the stated practice and knowledge sections of the questionnaire. All stated practice questions, except number seven, had an index of item-objective congruence of +1.00. One content specialist disqualified herself from rating question seven concerning a specialised area of practice outside of her experience. The remaining two content specialists gave question seven an index of item-

objective congruence of +1.00. All knowledge questions had an index of item–objective congruence of +1.00. The content of the questionnaire was therefore accepted as valid.

To trial the questionnaire a pilot study was carried out to determine the clarity of the questions, effectiveness of instructions, completeness of response sets, and the time required to complete the questionnaire. Comments made by participants in the pilot study resulted in the addition of a hand washing choice in the stated practice section, and in the knowledge section the change of wording in one multiple choice question, and the changing of an answer in one multiple choice response. These minor adjustments were made to the questionnaire before the data collection commenced.

Data Collection

The data collection took place over a one–week period. The investigator personally took the questionnaires to the areas.

To protect human rights the investigator gave the subjects verbal information and a written explanation was attached to each questionnaire (Appendix C). Subjects were informed that to protect their identity no names would be recorded, and no record was kept of the day, the time, or the group from which the questionnaires came. Consent was assumed by subjects volunteering to return a questionnaire, and the subjects were informed that they would not be discriminated against for not

being involved, and that they could withdraw from the study at any time.

Also the subjects were informed of the purpose and use of the collected data, and that the results of the study would be presented to the hospital and participants after completion of the study.

Slit top boxes were provided for subjects to place the completed questionnaires in, and the investigator collected the boxes each day.

On the first day the two Geriatric Wards were visited at handover time when both the day and evening staff were present. The same format was used the second day for the Maternity and General Medical and Surgical Wards. The areas were visited in the same way every second day during the week, three times in all. The staff from the Operating Rooms were invited to take part on one day only and all staff not on leave were present that day. On two alternative nights the nightstaff in all four wards were invited to participate. Of the 100 questionnaires distributed 77 were completed and returned. This represented a 77% return.

Methodological limitations occur in using a questionnaire to assess stated compliance. With the use of a questionnaire the problem exists in assuming practice on the basis of stated behaviours, and it is assumed that participants honestly state their practice. To assess compliance direct observations are often used, but due to time restraints and complexities involved in using observations this

was not possible in this study. To help establish the level of instrument reliability it was intended to use Cronbach's coefficient alpha to test for homogeneity of internal consistency for each of the scales in the instrument. Unfortunately the programme was not available to be used. It is recommended that this be done prior to the instrument being used in future studies.

It was not possible to assess concurrent validity because no other instrument was available for comparison.

RESULTS

At completion of the data collection the data were coded prior to analysis using the Statistical Analysis System (SAS). The level of significance was set at .05 for hypotheses testing.

The level designation of the subjects was divided into three levels.

Level A – Enrolled Nurses

Level B – Registered Nurses currently employed as a Level 1

Level C – Registered Nurses currently employed as a Level 2 or 3.

The area of work was divided into three categories according to the assumed risk level of nurses being exposed to splashing, or spraying, with patients' blood or body fluids.

Area 1 – high risk – operating rooms and maternity ward (included delivery suite).

Area 2 – moderate risk – general surgical and medical wards.

Area 3 – low risk – general geriatric and psycho geriatric wards.

Details of the sample numbers in each area of assumed risk and type of nurse are displayed in Table 1. The sample details of the area of assumed risk and experience are displayed in Table 2.

Table 1

Type of Nurse by Assumed Risk of Exposure

Level	Area 1	Area 2	Area 3	TOTAL
Level A	3	4	12	19
Level B	10	8	12	30
Level C	9	7	12	28
TOTAL	22	19	36	77

Table 2

Length of Clinical Experience by Assumed Risk of Exposure

Experience	N	Area 1	Area 2	Area 3
Under 6 months	1	0	1	0
6 months to < 1 year	1	0	1	0
1 to < 3 years	3	1	1	1
3 to < 5 years	7	1	2	4
5 to < 10 years	11	3	3	5
10 to < 15 years	18	8	3	5
15 to < 20 years	13	2	2	9
20 years and over	23	7	6	10

The mean, standard deviation, and range were calculated for the variables: stated practice, opinion and knowledge given in Table 3. This showed the level of stated practice to be low, having a mean score of 1.04 out of a maximum possible score of 7. Opinion and knowledge were of a reasonable level, opinion having a mean score of 43.57 out of a possible maximum score of 60, knowledge 6.97 out of a maximum possible score of 10.

Table 3

Mean, Standard Deviation, Range and Scale Limits Pertaining to Nurses' Stated Practice, Opinion and Knowledge

Variable	M	SD	Actual Range of Scores	Scale Limits of Scores
Stated Practice	1.04	1.14	0–4	0–7
Opinion	43.57	5.50	28–57	10–60
Knowledge	6.97	1.64	2–9	0–10

Stated practice, opinion, and knowledge scores, in relation to the nurses' characteristics of level designation, area of work, and length of experience, are given in Tables 4, 5, and 6.

Table 4

Mean, Standard Deviation, and Range of Stated Practice Scores by Nurse Level, Area and Experience

Variable	N	M	SD	Range
Level A	19	1	1.20	0–4
Level B	30	1.03	1.13	0–4
Level C	28	1.07	1.15	0–4
Area 1	22	1.09	1.19	0–4
Area 2	19	1.00	1.00	0–3
Area 3	36	1.02	1.20	0–4
Under 6 months	1	2	0	2
6 months to < 1 year	1	0	0	0
1 to < 3 years	3	.3	.5	0–1
3 to < 5 years	7	1.71	1.60	0–4
5 to < 10 years	11	1.27	1.27	0–4
10 to < 15 years	18	0.94	1.11	0–3
15 to < 20 years	13	1.15	0.99	0–3
20 years and over	23	0.91	1.08	0–4

Table 5

Mean, Standard Deviation, and Range of Opinion Scores by Nurse Level, Area, and Experience

Variable	N	M	SD	Range
Level A	19	43.74	4.16	35–50
Level B	30	43.43	6.15	28–54
Level C	28	43.61	5.75	30–57
Area 1	22	44.82	6.24	30–57
Area 2	19	43.21	6.35	31–54
Area 3	36	43.00	4.50	28–49
Under 6 months	1	54.00	0	54
6 months to < year	1	43.00	0	43
1 to < 3	3	45.00	5.57	40–51
3 to < 5 years	7	39.14	5.14	35–49
5 to < 10 years	11	45.36	3.32	42–51
10 to < 15 years	18	43.88	7.19	30–57
15 to < 20 years	13	44.31	5.63	28–50
20 years and over	23	42.78	4.25	35–49

Table 6

Mean, Standard Deviation, and Range of Knowledge Scores by Nurse Level, Area, and Experience

Variable	N	M	SD	Range
Level A	19	6.42	1.71	2–8
Level B	30	7.30	1.56	3–9
Level C	28	7.00	1.63	3–9
Area 1	22	6.95	1.49	4–9
Area 2	19	7.49	1.68	2–9
Area 3	36	6.72	1.68	3–9
Under 6 months	1	54.00	0	54
6 months to < 1 year	1	43.00	0	43
1 to < 3 years	3	45.00	5.57	40–51
3 to < 5 years	7	39.14	5.14	35–49
5 to < 10 years	11	45.36	3.32	42–51
10 to < 15 years	18	43.88	7.19	30–57
15 to < 20 years	13	44.31	5.63	28–50
20 years and over	23	42.78	4.25	35–49

The degree to which knowledge, opinion, and stated practice are associated was computed through simple correlations and is reported in Table 7. The correlations were small and not significant. In order to know the impact of the variables, knowledge and opinion, on stated practice, forward multiple regression was computed. Knowledge having the higher correlation was used first, to be followed by opinion. The result was $F(1,75) = 1.38$, $p<.24$, which was not significant, shown in Table 8. With this result the multiple regression ceased and opinion was not computed.

Table 7

Correlation Matrix of Stated Practice, Opinion and Knowledge

Variable	Opinion	Knowledge
Stated Practice	0.053	0.134
Opinion	-	0.222

Table 8

Significance of Variance in Stated Practice Accounted for by Knowledge

Variable	df	Sum of Squares	Mean Square	F	p
Knowledge	1	1.78	1.78	1.38	.24
Error	75	97.1	1.29		
TOTAL	76	98.88			

To further establish if the variables, area, level designation, and experience had any effect upon stated practice, a one-way analysis of variance was computed. None were significant, and individually the computed results showed: area, Table 9, $F(2,74) = 0.03$, $p<.96$, level; Table 10, $F(2,74) = 0.02$, $p<.98$; and experience, Table 11, $F(7,69) = 0.88$, $p<.52$.

Table 9

One-way Analysis of Variance of Stated Practice by Area

Variable	df	Sum of Squares	Mean Square	F	p
Area	2	0.93	0.05	0.03	.96
Error	74	98.79	1.33		
TOTAL	76	98.88			

Table 10

One-way Analysis of Variance of Stated Practice by Nurse Level

Variable	df	Sum of Squares	Mean Square	F	p
Level	2	0.06	.03	.02	.98
Error	74	98.82	1.33		
TOTAL	76	98.88			

Table 11

One-way Analysis of Variance of Stated Practice by Experience

Variable	df	Sum of Squares	Mean Square	F	p
Experience	7	8.14	1.16	0.88	.52
Error	69	90.74	1.31		
TOTAL	76	98.88			

Question results in the opinion section revealed the following points of interest. Of those surveyed 37.47% agreed, 7.8% strongly agreed, that nursing has a low level of health hazard in the work place. Also 72.73% agreed, 45.45% strongly agreed, that in providing health care for others, nurses face a high personal risk factor. Furthermore 55.74% agreed, 38.04% strongly agreed, that it would be a waste of money to provide protective clothing in all patients' rooms. When wearing gloves 66.23% agreed, 20.78% strongly agreed, that it made it awkward and difficult to carry out procedures. Of the nurses surveyed, 84.42% agreed, 70.13% strongly agreed, that nurses are best protected by knowing the patient's diagnosis. Finally 74% agreed, 42.86% strongly agreed, that putting on gloves, plastic aprons, and goggles as recommended was easy.

DISCUSSION

This study has revealed that although nurses may have a reasonable level of knowledge and a positive opinion towards Universal Precautions, their stated practice of the use of Universal Precautions may be low. The nurses' level designation of employment, area of work, and the length of clinical experience had no significant effect on the level of stated practice. The results showed none of the variables examined had any significant effect upon the low level of stated practice.

Findings must be viewed with caution because the instrument used to collect the data was new and needs further testing for validity and reliability. Baroff and Talan (1989) and Kelen and Associates (1989) also found a low level of compliance to Universal Precautions. The methodology they used was observational and the population different, but it would appear that it is doubtful that health care workers are using recommended cross infection policies to a high degree.

An examination of the results in relation to the specific study objectives reveal the following points. The use of Universal Precaution principles as shown by the subjects stated practice was low ($\underline{M}$ = 1.04, maximum possible score 7). This reflects a low level of stated compliance by the nurses in this study. In their conclusions Baroff and Talan (1989) commented that the un-acceptable rate of compliance found in their study may have been partly due to the impression that protective equipment was unavailable. The same comment could apply to this study

as protective attire was not visibly available in all areas. The major application of Universal Precautions is to wear the appropriate protective attire when handling blood and specified body fluids, and in situations where ocular and/or mucous membrane exposure to splash or spray of body fluids is likely to occur. Yet the availability of protective attire in visibly, and easily assessable places in all work areas is not yet common practice. The time involved, and the perceived difficulty of obtaining the appropriate protective attire, may indeed cause nurses not to stop to implement Universal Precautions as recommended. If cross infection policy makers expect health care workers to use the recommended techniques to protect themselves and other patients from nosocomial diseases, then the appropriate equipment must be readily available in all work areas.

Many of the subjects had acquired a reasonable level of knowledge about Universal Precautions ($\underline{M}$ = 6.97, maximum possible score 10). The subjects level of knowledge of Universal Precaution principles had no significant effect upon their stated practice. Nurses having an acceptable level of knowledge, about Universal Precautions principles, did not always state compliance in practice. Where subjects obtained their knowledge from was unclear as relevant data was not collected. It was assumed that the major source of knowledge was in-service education programs offered by the hospital used in the study. It is of concern that nurses have shown they have the necessary knowledge about the principles of Universal Precautions yet are not stating they practice these principles The knowledge assessed in this study was about the principles involved in the use of Universal

Precautions. Perhaps the subjects had a knowledge deficit in regards to the significance of the development of Universal Precautions. That is the fact that Universal Precautions were developed because there was, and still is, no other means of protecting health care works from contracting AIDS in the work place. Universal Precautions guidelines developed from a decision by the C.D.C. in 1988 in response to the AIDS epidemic. Even so Universal Precautions is not promoted as a specific means of protection against AIDS. Zeidenstein (1989) states 'The primary pre-requisite for the implementation of Universal Precautions is acceptance that we are practising in the midst of a deadly health crisis' (P. 282) It may be that nurses do not associate the use of Universal Precautions with the risk of contracting AIDS. To increase compliance educational programs developed for health care workers may need to place more emphasis on the reasons for the development of Universal Precautions, and the major personal health risk of not using Universal Precautions.

Health care and hospital authorities do not wish to cause fear and anxiety out of proportion to the calculated assumed low occupational risk. However this must be balanced against the need for improved compliance in the use of Universal Precautions. At present the use of Universal Precautions is the only known means of protecting hospital staff against the risk, however small, of contracting a fatal disease.

The positive opinion level ($\underline{M}$ = 43.51, maximum possible score 60) showed support of cross infection principles, but this was not significant and showed no effect upon the level of stated practice. Though the total mean scores showed positive support, the subjects did not support the principle that represents the change of emphasis in Infection Control on which Universal Principles is based, namely isolating the source of infection rather than isolating the diagnosed infectious patient. In this survey 84.42% of the subjects were of the opinion they were best protected by knowing the patient's diagnosis. The principle of relying on the patient's diagnosis as a means of knowing what precautions to take, in protection from cross infection, is hard to change. For so long cross infection policy, until the advent of the AIDS epidemic, was based on isolating the diagnosed infectious patient. This change in cross infection emphasis of not relying on a patient's diagnosis and isolating the source of infection, blood and certain body fluids, in all patients only occurred in the 1980s. This persisting belief that nurses are best protected by knowing the patient's diagnosis may be influencing the lack of use of Universal Precautions, in that nurses may have a feeling of false security in handling the blood and certain body fluids of patients who have not been diagnosed as having pathogens present in these substances. It is the undiagnosed infection the patient may have that is the potential health hazard and nurses need to change to believing that they are best protected in the work place by treating all patients' blood and certain body fluids as potentially infectious.

There was very little difference in the mean scores of stated practice in the three area of work categories. Area 1, high risk, had a mean score of 1.09, Area 2, moderate risk, had a mean score of 1.00, and Area 3, low risk, had a mean score of 1.02. Furthermore the computed analysis of the results showed that the assumed risk level of nurses being exposed to splashing or spraying with patient's blood or body fluids had no significant effect on the level of stated practice. Cross infection experts, when making the Universal Precaution recommendations, used the terms when at risk of splashing or spraying with blood or certain body fluids. The lack of stated adherence to the Universal Precautions principles in areas that nurses are regularly exposed to such substances, and assumed to be at a high risk level of being splashed or sprayed with such substances, may be due to lack of associating these substances as infectious unless the patient has been diagnosed as having pathogens in their blood or certain body fluids. This would support the lack of change in the nurses belief system as demonstrated in their response of still believing they are best protected by knowing the patients diagnosis, as discussed previously.

The effect of the subjects' years of experience in direct patient care on stated practice was computed as not significant. It was difficult to analyse the conflicting results shown by the effect of each range of experience on stated practice. The five nurses with more than six months, and less than three years experience, recorded a stated practice mean score of 0.02, the lowest mean score. The seven nurses with three years experience, but less than five years experience, recorded a stated

practice mean score of 1.71, the highest mean score. The 23 nurses with 20 years and more experience recorded a stated practice mean score of 0.91, the second lowest mean score. This may be indicating that the more experienced the nurse the lower the stated practice will be, though such a statement must be viewed with caution. Even so, these results may be suggesting that years of experience can affect stated practice. In the total figures over 70% of the subjects involved in this study had over 10 years experience in direct patient care. The results of this study can therefore be viewed as coming from very experienced nurses. The years of experience may have affected the low level of stated practice because the years of exposure to patients' blood and body fluids may have created a feeling of false security in regards to the personal health threat from these substances which now needs to be reversed by a change in the nurses belief system in line with Universal Precaution principles of regarding all patients' blood and certain body fluids as potentially infectious. Remembering this change of cross infection principles only occurred in the 1980s and the more experienced nurses would have been educated in accordance with the Cross Infection principle of isolating the diagnosed infectious patient rather than isolating all patients' blood and certain body fluids as potentially infectious. The practice of this principle would be well ingrained in their belief system. The less experienced nurses possibly received their nursing education in the mid to late 1980s. They may or may not have been taught the change of emphasis in Cross Infection principles. If they had been taught to isolate the diagnosed infectious patient rather than isolating all patients' blood and certain body fluids as potentially infectious it would not be as ingrained in their belief

system to the same extent as that of the more experienced nurses.

There was very little difference in the mean scores of the nurses in the three levels of employment designation. Level A, Enrolled Nurses, had a mean score of 1, Level B, Level 1 Registered Nurses, had a mean score of 1.03, and Level C, Level 2 or 3 Registered Nurses had a mean score of 1.02. The computed analysis of the results showed that the level of employment designation had no significant effect upon the subjects stated practice. Literature and educational material before the early 1980s taught all level of nurses the belief system that special infectious required special procedures and all levels of nurses were left with the belief that routine patient care practices are inadequate to prevent transmission of infectious diseases. The use of Universal Precautions as recommended by cross infection experts is a routine practice for all patients.

Of the points discussed in relation to the specific study objectives the nurses established belief system may be the biggest hurdle to compliance of Universal Precautions practice. The nursing care management is basically still diagnosis based, the conflict between the nurse wanting to know the patients' diagnosis and the principles of Universal Precautions will need to be resolved. It will no doubt take more time and further education to convince nurses they are best protected in the work place by practising the principles of Universal Precautions in treating all patients' blood and certain body fluids as potentially infectious.

This study, though not conclusive, indicates that nurses' stated compliance to Universal Precautions is low. If this is so it means nurses are not following recommended techniques of preventing cross infection. There are many possible factors which may affect this lack of stated compliance and there is a need for further research to examine this question of recommended nosocomial disease protection.

RECOMMENDATIONS

1. To further study the factors that may influence nurses' use of Universal Precautions.

2. Re-enforce, by repeated education of staff, the change of cross infection principle involved in Universal Precautions of treating blood and certain body fluids of all patients as potentially infectious.

3. To make protective attire more visibly and easily available and accessible in all areas of the work place.

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APPENDIX A

QUESTIONNAIRE

Protection of Nursing Staff Survey

Imagine yourself in the following real life scenes.

What would you do in each situation in order to protect yourself in a cost effective manner.

1. An elderly man with Parkinsons disease and dementia, after using a urinal spills the urine in his bed. You go to change the bed linen.

   What action do you take **BEFORE** you attend to the patient.

   Circle your answer or answers.

   A. No action
   or
   The following can be more than one action.
   B. Put on goggles
   C. Put on gloves
   D. First wash hands
   E. Put on a plastic apron
   F. Put on a mask

2. A middle aged woman is admitted with a history of a gastric ulcer and vomiting coffee ground coloured fluid. You answer her call bell and find her vomiting frank blood. You go to her assistance.

   What action do you take **BEFORE** you attend to the patient.

   Circle your answer or answers.

   A. No action
   or
   The following can be more than one action.
   B. Put on goggles
   C. Put on gloves
   D. First wash hands
   E. Put on a plastic apron
   F. Put on a mask

3. A young woman with a crushed right hand is admitted to hospital. She continues to breast feed her three week old baby, who has been admitted with her. She requests your assistance to express some milk.

What action do you take, **BEFORE** you attend to the patient.

Circle your answer or answers.

A. No action
or
The following can be more than one action
B. Put on goggles
C. Put on gloves
D. First wash your hands
E. Put on a plastic apron
F. Put on a mask

4. A young male recovering from a head injury requires feeding at meal times. His past medical history includes a positive HIV blood test. He is quiet and co-operative and you go to feed him at lunch time.

What action do you take **BEFORE** you attend to the patient.

Circle your answer or answers.

A. No action
or
The following can be more than one action
B. Put on goggles
C. Put on gloves
D. First wash your hands
E. Put on a plastic apron
F. Put on a mask

5. A middle aged woman, one day post operation following a cholecystectomy has developed a productive cough. She requires a lot of assistance and encouragement to deep breath and cough. To obtain a sputum specimen you are going to assist her to cough.

What action do you take **BEFORE** you attend to the patient.

Circle your answer or answers.

A. No action
or
The following can be more than one action.
B. Put on goggles
C. Put on gloves
D. First wash your hands
E. Put on a plastic apron
F. Put on a mask

6. An elderly man recovering from a haemorrhoidectomy has just gone back to bed after having his bowels opened. He calls you over and says he thinks he has had a further bowel action in the bed. You ensure privacy and pull back the bed linen and see a large pool of blood and faeces.

What action do you take **BEFORE** you attend to the patient.

Circle your answer or answers.

A. No action
or
The following can be more than one action.
B. Put on goggles
C. Put on gloves
D. First wash your hands
E. Put on a plastic apron
F. Put on a mask

7. The maternity unit is very busy and you have been asked to give a new born baby its first bath. The mother is well but sedated. The baby is physically normal and in no distress.

What action do you take **BEFORE** you attend to the baby.

Circle your answer or answers.

A. No action
or
The following can be more than one action.
B. Put on goggles
C. Put on gloves
D. First wash your hands
E. Put on a plastic apron
F. Put on a mask

WHAT IS YOUR OPINION OF THE FOLLOWING STATEMENTS:
RATE THEM ON A SCALE OF 1 TO 6
CIRCLE THE APPROPRIATE NUMBER

STATEMENT

1. Nursing, when compared to other occupations, has a low level of health hazard in the work place

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

2. Nurses are best protected by knowing the patients' diagnosis of any infectious disease.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

3. Using gloves means you don't have to wash your hands as often.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

4. It would be cost effective, and create no risk, if the nurse wore the same pair of gloves for several patients as needed.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

5. Wearing gloves makes it awkward and difficult to carry out procedures.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

6. A nurse's best protection from infection is an intact skin.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

7. It is easy to put on gloves, plastic apron, and goggles as recommended.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

8. In providing health care for others, nurses face a high personal risk factor

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

9. Making plastic gloves, goggles, masks and plastic aprons available in every patients room is a waste of money.

   Strongly Agree 1 2 3 4 5 6 Strongly Disagree

10. The best protection from cross infection is hand washing after patient contact.

    Strongly Agree 1 2 3 4 5 6 Strongly Disagree

CIRCLE THE APPROPRIATE ANSWER: (one answer only)

1. Plastic gloves should be worn:

   a. when handling blood, tissue and body fluids of all patients.
   b. when both your hands are affected by dermatitis.
   c. when handling blood, tissue and body fluids of a patient with a diagnosed infection.
   d. all of the above.

2. Plastic aprons should be worn:

   a. When you need to wear your uniform twice before it is washed.
   b. When you may be splashed with body fluids.
   c. When you have a cut on your abdomen.
   d. All of the above.

3. Goggles and masks should be worn:

   a. When you have an infected eye.
   b. When you may be sprayed with body fluids.
   c. When you do a mouth toilet.
   d. All of the above.

4. Which of the following constitutes a "significant exposure":

   a. Blood splash to mouth, nose, eyes, or an open skin lesion.
   b. Needlestick with a sterile needle.
   c. Mouth-to-mouth resuscitation.
   d. All of the above.

5. Patients with infections that spread through only blood or body fluids:

   a. Will always have the diagnosis written in the notes.
   b. Will be adequately isolated if routine procedures of blood and body fluids precautions are carried out.
   c. Will most often have obvious symptoms and be identifiable by clinical assessment.
   d. All of the above.

6. Overwearing of gloves when not indicated may result in:

   a. Increased contamination of the environment.
   b. Increased risk of cross-infection to patients.
   c. Increased risk to employee hand irritation/dermatitis.
   d. All of the above.

7. Hand washing is now considered:

a. To be replaced by using gloves when handling blood and body fluids.
b. To be the most important means of preventing cross infection.
c. Not necessary if gloves have been worn.
d. None of the above.

8. To maintain your skin protection you should:

a. Frequently use a moisturiser
b. Cover cuts with a waterproof sealed dressing.
c. Wear gloves if you have chaffed hands.
d. All of the above.

9. Used needles should always:

a. Be recapped and placed in a waterproof bag prior to disposal.
b. Be recapped, carried in a container, and disposed of in a sharps container.
c. Not be recapped, carried in a container, and disposed of in a sharps contained.
d. Not be recapped, carried in the hand, and disposed of in a sharps container.

10. Last night you cut yourself on the middle finger of your left hand. This morning the cut is dry. What should you do when you arrive at work:

a. Place a band-aid over the cut.
b. Leave the cut exposed.
c. Put on a plastic glove.
d. Put a waterproof, sealed dressing over the cut.

APPENDIX B

DEMOGRAPHIC DATA

Please tick the appropriate answer:
Category of employment designation:

- Enrolled Nurse .....[ ]
- Registered Nurse Level One .....[ ]
- Clinical Registered Nurse Level Two.....[ ]

Are you currently involved in direct 'hands on' patient care?

- Yes .....[ ]
- No .....[ ]

Experience:

How many years/months experience of direct patient care?

- UNDER 6 months .....[ ]
- 6 months and over/BUT under a year.....[ ]
- 1 year and over including 2 years .....[ ]
- 3 years and over including 5 years.....[ ]
- 6 years and over including 9 years .....[ ]
- 10 years and over including 14 years.....[ ]
- 15 years and over including 19 years.....[ ]
- 20 years and over .....[ ]

What type of nursing are you CURRENTLY INVOLVED IN?
Please tick the ONE you spend the MOST time being involved in :-

- Operating Room .....[ ]
- Maternity .....[ ]
- Geriatrics .....[ ]
- General Medical and Surgical .....[ ]
- If not listed, please state .....[ ]

APPENDIX C

PROTECTION OF NURSING STAFF SURVEY

Dear Colleague

I am inviting you to take part in a survey I am conducting for the degree of Bachelor of Health Science (Nursing) Honours program at the Western Australian College of Advanced Education.

The purpose of this study is to examine how you, as nurses, protect yourselves when involved in direct patient care.

To protect your identity no names will be recorded, and no record will be kept of the day, the time or the group, from which the completed questionnaires come. I alone shall be the recorder of data from the completed questionnaires, which shall be destroyed at the conclusion of the study.

Your participation is purely voluntary, and you will not be discriminated against for not being involved. You may leave the group at any time.

It is very important to answer all questions exactly as you feel about them, because the information gained from you who are involved in direct 'hands on' patient care is vital and could be used in determining future needs and possible policy reviews.

At the completion of the study a verbal and written report of the results will be presented to each unit that participated in the data collection, at an appropriate time to be arranged with the hospital.

Thank you for participating in the survey.

Yours sincerely

ROBIN JACKSON R.N.