

Knowledge And Practice Towards Prevention Of Pressure Ulcers Among Nurses In Selected Private Hospitals In Calabar Metropolis, Cross River State, Nigeria

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Abstract: This descriptive survey assessed knowledge and practice regarding prevention of pressure ulcer among nurses in selected private hospitals in Calabar Metropolis. A validated questionnaire was used to collect data from eighty nine (89) registered nurses working in 22 purposely selected private hospitals. Data were analyzed using descriptive statistical method such as frequencies and percentages. Results revealed that: Majority (84.3%) of the nurses working at private hospitals in Calabar Metropolis have good knowledge of prevention of pressure ulcers. The level of practice of pressure ulcer prevention among nurses in the private hospitals was also good, Factors such as shortage of nurses, lack of utilization of research findings, poor work attitude of nurses, lack of nurses' exposure to continuous education on current pressure ulcer preventive strategies, and lack of pressure prevention materials and equipments were found to be major factors affecting the practice of pressure ulcer prevention in private hospitals in Calabar Metropolis. Recommendations: more nurses should be recruited in private hospital so as to reduce work load. Nurses in private hospitals should be exposed to continuous education, research and be provided with pressure Ulcer prevention materials and equipments. This will help them to practice pressure ulcer prevention effectively.

Key Words: Nurses, private clinics, pressure ulcer, prevention

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I. Introduction

Pressure ulcers (PUs) pose a serious health problem in all health care settings and resident homes across the globe, especially in developing and third world countries (The United Kingdom Care and Support Alliance, 2017). Early recognition of patients that are at risk of developing pressure ulcers by nurses is an essential part of preventive care. In developing Countries, pressure ulcer constitute a remarkable challenge in modern medical and nursing practice (Kruger, Pires, Ngann, Sterling & Rubayi, 2013). In Africa, as well as other developing countries in the world, pressure ulcers develop in 8 out of every 10 confined and immobile patients both in hospital and home settings, most often as a result of poor assessment and management of the patients by nurses (Ostadabbas, Yousefi, Faezipour & Nourani, 2011, The United Kingdom Care and Support Alliance, 2017). No national surveys have been conducted in Nigeria, therefore information concerning prevalence and incidence are not currently available. However, Onigbinde, Olafimihan, Ojoawo, Mothabeng, Ogundiran (2011) noted that PUs are very common in Nigerian hospitals, particularly among mobility-compromised patients, and affect approximately 9% of hospitalized patients within the first 2 weeks of admission. Furthermore Onche, Yiltock, Obiano (2004) confirmed high incidence of PUs in Gombe state, Nigeria. A pressure ulcer, sometimes called a bedsore, is a localized injury to the skin or underlying tissue caused by pressure mostly over a bony prominence, friction and moisture. Ulcers often occur when patients have limited mobility and can't change positions in bed on their own. Having adequate knowledge of risk assessment to identify at risk patients, risk factors and vulnerable patients is an important strategy in preventing pressure ulcer. Such factors may include **extremes of age**, patients with chronic illnesses such as cardiovascular diseases, diabetes mellitus, anemia, Alzheimer's disease, obesity, congestive cardiac failure (CCF),

cardiovascular accident (CVA) and malignancy, imbalanced nutrition especially lack of protein calories and vitamin C for long periods causing progressive weight loss, decrease soft tissue mass and subcutaneous fat padding (Neloska, Damevska, Nikolchev, Pavleska, Petreska- Zovic& Kostov, 2016, the consortium of Spinal Cord Medicine 2010) For risk areas high frequency sites include the sacrum (38.3%), the ischium (25.5%) and the heel (23.4%), other sites include occipital bone, temporal bone, scapular, spinous processes, elbow, iliac crest, coccyx, Achilles tendons, ear lobe, shoulder anterior iliac crest, trochanter, thigh, medial, lateral knee, lower leg and malleoli (Consortium for Spinal Cord Medicine, 2010).

Prevention requires that knowledgeable assessment be carried through **History taking, observations, physical examination** which involves palpation and inspection. Palpation will reveal thinness of the skin, warmth, numbness or loss of motor function, all of which place a patient at high risk for pressure sore (Mann, 2012). It also requires **use of pressure ulcer Risk assessment tools** such as Braden scale, Norton's Pressure Area Risk Assessment form scale, by nurses in identifying clients at high risk for pressure ulcer development (Fosco 2012, Moore and Cowman 2014). Studies around the world have revealed that knowledge of pressure ulcer assessment and prevention among nurses in hospital setting is poor (Nurhusien, Fisseha, Senafikish & Yohannes, 2015; Ilesanmi & Olabisi, 2014; Uba, Alih, Kever & Lola, 2015). Some studies have been carried out in many public hospitals concerning nurses' assessment and prevention of pressure ulcer in Nigeria by Ilesami, Ofi and Adejumo 2012, Onche, Yiltock, Obiano (2004) Onigbinde, Olafimihan, Ojoawo, Mothabeng, Ogundiran (2011) and a few in Cross River state in particular, but none have been undertaken in private hospitals in Cross River State. It is for this reason that this study was conducted to assess knowledge and practice regarding prevention of pressure ulcer among nurses in selected private hospitals in Calabar Metropolis.

Purpose of the study

The study was designed to assess knowledge and practice regarding prevention of pressure ulcer among nurses in selected private hospitals in Calabar Metropolis.

Specific objectives were:

- 1) To assess knowledge of prevention of pressure ulcer among nurses in selected private hospitals in Calabar Metropolis.
- 2) To determine the level of practice of pressure ulcer prevention among nurses in selected private hospitals in Calabar Metropolis.
- 3) To examine the factors affecting the practice of pressure ulcer prevention among nurses in selected private hospitals in Calabar Metropolis.

Significance of the study

The findings will identify gaps (that needs improvements) in knowledge and practice of pressure ulcer prevention among nurses in private hospitals in Calabar. This study will contribute to existing knowledge on prevention of pressure ulcer as well as serve as a resource material to future researchers into pressure ulcer assessment and prevention. It will serve as a database for quality care on pressure sores. Recommendations if fully implemented will greatly reduce the morbidity and mortality associated with pressure ulcers.

II. Literature review

Knowledge of Prevention of Pressure Ulcer The studies of Mwebaza, Katende, Groves and Nankumbi (2014) Ilesanmi and Olabisi (2014) and Miyazaki, Caliri and dos Santos (2010), Jamal and Abdullah (2014), Simonetti, Comparcini, Flacco, Giovanni and Cicolini (2015) reveal that Nurses displayed knowledge deficit in pressure ulcer prevention. Ilesanmi, Ofi, Adejumo (2012) study on Nigerian nurses' level of knowledge of PU preventive interventions results confirmed that many PU prevention interventions in Nigeria are based on tradition and that a structured educational approach was needed to enable Nigerian nurses provide evidence-based PU prevention interventions. Furthermore Onche, Yiltock, Obiano (2004) had attributed the high incidence of PU in Gombe State to inadequate knowledge of preventive interventions among practitioners and the absence of a policy requiring the use of pressure-redistributing equipment in the hospital. However Kallman and Suserud (2013), Adejumo and Ingwu (2010) studies revealed that nurses had good knowledge of pressure ulcer prevention. Practice of Pressure Ulcer Prevention Kallman and Suserud (2013) study revealed that respondents had good knowledge on prevention and treatment of pressure ulcer and positive attitude towards its care, but however concluded that positive attitudes are not enough to change practice. Similarly, Nurhusien, Fisseha, Senafikish and Yohannes (2015), in Ethiopia found that practice of the nurses regarding prevention of pressure ulcer was inadequate. Also Uba, Alih, Kever and Lola (2015) study revealed low level practice of pressure ulcer prevention among nurses in University of Maiduguri Teaching Hospital. The authors however found a significant relationship between nurses' work experience and practice of pressure ulcer prevention. Implying that the more experienced the nurses, the better their practice in the prevention of pressure ulcers.

Furthermore Pieper, Mikols, Mance and Adams (2010) studied nurses' documentation of pressure ulcers as a reflection of their abilities to appropriately recognize patients' in need for change in care based on ulcer presentation. A sample of 167 patients on high or low air loss mattress therapy was scrutinized. The authors reported that nursing documentation was significantly incomplete (poor practice) across critical categories and related description, such as, location, staging, healing, size, color, exudates and odor. They suggested that intensive education of the nursing staff especially on documentation was needed. Jordan-O'Brien (2009) study on nurses' quality and nature of documentation in pressure ulcer prevention and management, still affirmed nurses inadequacy in the practice.

Factors Affecting the Practice of Pressure Ulcer Prevention

The study of Mwebaza, Katende, Groves and Nankumbi (2014) revealed that barriers affecting practice were related to shortage of staff, lack of time and logistics for pressure ulcer prevention, lack of risk assessment tools, poor access to current literature on pressure ulcer prevention and ability to translate nurses' knowledge into practice. The investigation of Stranda and Lindgren (2010) on registered nurses' attitudes, knowledge and perceived barriers and opportunities towards pressure ulcer prevention, in an ICU setting, reported barriers to include lack of time (57.8%) and severely ill patients (28.9%); opportunities were knowledge (38%) and access to pressure relieving equipment (35.5%). Similarly, Nuru, Zewdu, Amsalu and Mehretie (2015) institutional-based cross-sectional survey among 248 nurses to assess knowledge and practice of nurses towards prevention of pressure ulcer and associated factors in Gondar University Hospital, Northwest Ethiopia revealed that satisfaction with nursing leadership, staff shortage and inadequate facilities and equipment were significantly associated with the practice on prevention of pressure ulcer.

III. Theoretical Framework

Betty Neuman's system Model is applied in this study. The model deals with measures undertaken by nurses to prevent the development of pressure ulcer in patients. Two of the basic assumptions of this model are that each client system is unique, a composite of factors and characteristics within a given range of responses contained within a basic structure. Secondly that many known, unknown, and universal stressors exist. Each differ in its potential for disturbing a client's usual stability level or normal LOD (Line of Defense). For patients to experience pressure ulcer, certain etiological factor (stressors) which must have induced its occurrence are involved. Such include Pressure/compression of tissues and/or destruction of muscle cells, shearing, and the microclimate etc. Broadly, the goal sought in this model is the stability of the system (the whole person). Nursing intervention focus is on retaining and maintaining system stability which is carried out on three preventive levels: primary prevention, secondary prevention and tertiary prevention. Primary prevention relates to client assessment and intervention, in identification and reduction of possible or actual risk factors. Secondary prevention relates to symptomatology following a reaction to stressor, appropriate ranking of intervention priorities and treatment to reduce their noxious effects. Tertiary prevention relates to adjustive processes taking place as reconstitution begins and maintenance factors move the back in circular manner toward primary prevention. The role of the nurse is seen in terms of degree of reaction to stressors, and the use of primary, secondary and tertiary interventions.

IV. Materials And Methods

The descriptive survey design was adopted for this study. This research was carried out in Calabar Metropolis. Calabar metropolis is comprised of Calabar Municipality and Calabar South Local Government Areas in Cross Rivers State (CRS), Nigeria. The metropolis has a total of 118 public and private hospitals (the public institutions include tertiary, secondary and primary); Out of the 118, fifty-four (54) are private clinics (Department of Planning Research and Statistics (PRS), Cross River State Ministry of Health, (CRSMOH) Calabar 2017).

The study population consisted of all nurses working in private clinics in Calabar Metropolis totaling 173. Purposive sampling was adopted to select only the clinics that had 3-6 trained registered nurses/midwives to include in the study. Those with one or two trained registered nurse/midwives and /or auxiliary nurses only were not included. A total of 22 met this criterion with 89 trained registered nurse/midwives. Given that there were only 89 registered nurse/midwives working in the selected private hospitals, the study involved all of them to increase the power of the study. A set of semi structured self developed questionnaire was used. The instrument sought information on Socio-demographic characteristics of respondents; their knowledge on pressure ulcer prevention, level of practice in pressure ulcer prevention, and factors affecting the practice of pressure ulcer prevention. Positive comments by psychometric experts were suggestive for the face validity of the instrument. A measure of its stability over time was assessed using a test - retest procedure which yielded a reliability coefficient of 0.79% after an interval of two weeks.

Administrative Design

The questionnaire was administered within four weeks to all the respondents in the selected private clinics. This was done with the aid of four (4) students from the University of Calabar who were trained (on the objectives of the study and on how to apply the instrument) and used as research assistants. Questionnaires administered were retrieved the spot without any loses. Permission to carry out the study in Calabar Metropolis was obtained from the State Ministry of Health and from the chairmen of Calabar metropolis and from the Medical directors of the selected private clinics. Questions were administered to the respondents after informed consent was obtained to participate in the study.

Every correctly answered question was awarded 2 marks. For knowledge on prevention and assessment, the respondents that scored twelve (12) points and above were considered having good knowledge while those who had less than twelve (12) points were considered having poor knowledge.

V. Data Analysis

Table 1a: Nurses' knowledge Level of risk assessment for pressure ulcer prevention.

Knowledge Variables	Responses				Total
	Yes		No		
	Freq.	%	Freq.	%	
Absence of pain sensation in immobile patients can precipitate pressure ulcer	69	77.5	20	22.5	174
Blanching skin color is an indication that pressure damage is starting	78	87.6	11	12.4	174
Reduced mobility or immobility constitutes higher risk of pressure exertion over bony prominences	89	100.0	-	-	89
Under nourished patients are at risk of developing pressure ulcers.	71	79.8	18	20.2	89
Reduced blood supply to the skin of patients can generate pressure ulcers	77	86.5	12	13.5	89
The surface on which patients sit/ lie or lean can increase the risk of pressure ulcer	66	74.2	23	25.8	89
Change of skin color in skin associated with pressure is indicative of pressure ulcer.	74	83.1	13	16.9	89
Shearing which hampers blood flow to the skin by stretching and contorting blood vessel can cause PU	75	84.3	14	15.7	89

Table 1b: Summary of Knowledge level of risk assessment pressure ulcer prevention

Knowledge Variable	No.	%
Good knowledge	75	84.3
Poor knowledge	14	15.7
Total	89	100.0

Results in Table 1a revealed that a greater number, 69 (77.5%) of the respondents were aware that absence of pain sensation in immobile patients can precipitate pressure ulcer. Seventy-eight, 78 (87.6%) respondents were aware that blanching skin color is an indication that pressure damage is starting. All the 89 (100.0%) respondents knew that reduced mobility or immobility constitutes higher risk of pressure exertion over bony prominences. In addition, 71 (79.8%) of the respondents were aware that under nourished patients are at risk of developing pressure ulcers. Also, 77 (86.5%) of the respondents were aware that reduced blood supply to the skin of patients can generate pressure ulcers. Sixty-six (74.2%) respondents were aware that the surface on which patients sit/ lie or lean can increase the risk of pressure ulcer. Lastly 75 (83.4%) respondents were aware that shearing which hampers blood flow to the skin by stretching and contorting blood vessel can cause PU. Most respondents had good knowledge of all the variables in under this segment Result in Table 1b shows that majority, 75 (84.3%) of the respondents had good knowledge of risk assessment for pressure ulcer risk factors, while 14 (15.7%) respondents had poor knowledge

Table 2: Nurses level of practice of pressure ulcer prevention in selected private hospitals in Calabar Metropolis

Level of Practice Variables	Responses				Total
	Yes		No		
	Freq.	%	Freq.	%	
Do you continuously assess all patients at risk for pressure sore and document findings?	82	92.1	7	7.9	89
Do you use pressure-relieving surfaces such as foams, pillows and pads to prevent pressure ulcer development in high risk clients?	63	70.8	26	29.2	89
Always assist patients to move in order to prevent development	60	67.4	29	32.6	89

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In table 82 (92.1%) respondents agreed that they assess all patients at risk for pressure sore and also document their findings. 63 (67.4%) used pressure-relieving surfaces such as foams, pillows and pads to prevent pressure ulcer development in high risk clients, while 60 (67.4%) respondents agreed that they assist patients to move in order to prevent development of pressure ulcer, but 29 (32.6%) of the respondents did not. For the 29 that did not this calls for concern

Table 3: Level of assessment for symptoms of pressure sores in private hospitals in Calabar Metropolis Calabar

Statements	Responses					Total
	Never	Daily	Once a week	More than once a week	Once a month	
How often are patients at risk chronically ill patients in your ward assessed for symptoms of pressure ulcer?	-	59(66.3%)	-	30 (33.7%)	-	89

Table 3 revealed that 59 (66.3%) respondents asserted that chronically ill patients in their ward are assessed for symptoms of pressure sores daily, while 30 (33.7%) respondents asserted that chronically ill patients in their ward are assessed more than once a week. This call for concern

Table 4: Frequency of changing bed position among in-bed patients in private hospitals in Calabar Metropolis Calabar

Statement	Responses				Total
	Once a day	Twice a day	Thrice a day	More than thrice a day	
How many times are the positions of immobile in-bed patients in your ward changed to prevent occurrence of pressure ulcer?	-	13 14.6%	27 30.3%	49 55.1%	89 100%
How many times are pressure ulcer patients assessed and dressed in your ward?	77 86.5%	12 13.5%	-	-	89 100%

Results in Table 4 revealed that 13 (14.6%) respondents agreed that the positions of immobile in-bed patients in their wards are changed twice a day to prevent occurrence of pressure ulcer, 27 (30.3%) respondents said thrice a day, while 49 (55.1%) respondents said the positions are changed more than thrice daily. Also, 77 (86.5%) respondents stated that pressure ulcer patients are assessed and dressed once a day in their wards, while 12 (0.8%) respondents said pressure ulcer patients are assessed and dressed twice a day.

Table 5: Factors affecting practice of pressure ulcer prevention among nurses in selected private hospitals in Calabar Metropolis

Knowledge Variables	Responses				Total
	Yes		No		
	Freq.	%	Freq.	%	
Pressure ulcer preventive strategies are not implemented due to shortage of nurses.	89	100.0	-	-	89
Lack of adequate knowledge of pressure risk areas among nurses is a major factor affecting the practice of pressure ulcer prevention.	11	12.4	78	87.6	89
Lack of utilization of research findings is a barrier to implementation of pressure ulcer preventive strategies.	89	100.0	-	-	89
Lack of nurses' exposure to continuous education on current pressure ulcer preventive strategies affects its prevention practice.	71	79.8	18	20.2	89
Poor work attitude of nurses affect implementation of pressure ulcer preventive strategies.	89	100.0	-	-	89
Pressure ulcer prevention practices are not implemented due lack of tools adequate pressure prevention materials and equipments.	35	39.3	64	40.7	89

Results in Table 5 revealed that all the 54 (100%) respondents asserted that shortage of nurses, lack of utilization of research findings, and poor work attitude of nurses are factors affecting the practice of pressure ulcer prevention among nurses. Eleven (12.4%) respondents were of the opinion that lack of adequate knowledge of pressure risk areas among nurses is a major factor affecting the practice of pressure ulcer prevention, but 78 (87.6%) respondents disagreed. Furthermore, 71 (79.8%) respondents reported that lack of nurses' exposure to continuous education on current pressure ulcer preventive strategies affects its prevention

practice, but 18 (20.2%) did not. Lastly, 35 (39.3%) respondents were of the opinion that pressure ulcer prevention practices are not implemented due lack of adequate pressure prevention materials and equipments, but 64(40.7%) were not

Following the result, the major factors affecting the practice of pressure ulcer prevention in private hospitals in Calabar Metropolis are: shortage of nurses, lack of utilization of research findings, and poor work attitude of nurses. Other factors included lack of nurses' exposure to continuous education on current pressure ulcer preventive strategies, and lack of pressure prevention materials and equipments.

VI. Discussion of findings

Knowledge Level of pressure ulcer prevention Pressure sores are caused by pressure of the body on bed at contact points particularly when skin is insensitive or where a person/patient lies immobile for a long time. Prevalence of pressure ulcer among critically ill patients can only be prevented by nurses if they have adequate knowledge of its risk areas, risk factors and are equipped to do so. The result showed that respondents had good knowledge of pressure ulcer prevention risk factors, this result is consistent to that of Kallman and Suserud 2013, and Adejumo and Ingwu 2010. The result is however in disagreement with that of Mwebaza, Katende, Groves and Nankumbi (2014) Ilesanmi and Olabisi (2014) and Miyazaki, Caliri and dos Santos (2010), Jamal and Abdullah (2014), Simonetti, Comparcini, Flacco, Giovanni and Cicolini (2015) reveal that Nurses displayed knowledge deficit in pressure ulcer prevention. Level of practice of pressure ulcer prevention.

The findings of this study also revealed that the level of practice of pressure ulcer prevention among nurses in private hospital in Calabar Metropolis was good. This is consistent with that of Kallman and Suserud (2013) revealed that respondents had good knowledge on prevention and treatment of pressure ulcer and positive attitude towards its care, but the result in disagreement with that of Nurhusien, Fisseha, Senafikish and Yohannes (2015), in Ethiopia and that of Uba, Alih, Kever and Lola (2015) in UMTH in North-Eastern, Nigeria which revealed that practice of the nurses regarding prevention of pressure ulcer inadequate, and of low level practice respectively. The findings further disagreed with Jordan-O'Brien (2009) which revealed that practice of pressure ulcer documentation by nurses in assessment and management was inadequate.

Factors affecting practice of pressure ulcer prevention

The result further revealed that the factors affecting the practice of pressure ulcer prevention were: shortage of nurses, lack of utilization of research findings, and poor work attitude of nurses are factors affecting the practice of pressure ulcer prevention among nurses. If The findings agree with the result Mwebaza, Katende, Groves and Nankumbi (2014), Jankowski and Nadzam's (2011), which revealed that shortage of nurses and negative work attitude were some major factors affecting the practice of pressure ulcer prevention. Furthermore the study revealed that lack of nurses' exposure to continuous education on current pressure ulcer preventive strategies, and lack of pressure prevention materials and equipments were factors that hindered prevention of pressure ulcers. This result is in line with that of a Stranda and Lindgren (2010), whose investigation revealed that factors mildly affecting the practice of pressure ulcer prevention were lack of adequate knowledge (38%) and lack adequate pressure relieving equipment (35.5%). Similarly, the findings correspond with a study by Nuru, Zewdu, Amsalu and Mehretie (2015), which revealed that staff shortage and inadequate facilities and equipment were found to be significantly associated with the practice on prevention of pressure ulcer.

However, considering the above factors as revealed in this study that affect pressure ulcer prevention among nurses in the private clinics, it could imply that nurses in the private clinics face challenges of shortage of manpower, Lack of utilization of research findings implementation of pressure ulcer preventive strategies and poor attitude of Nurses in the practice of prevention, and if so then their practice may not be as good as revealed in this result, except otherwise they were not sincere with their responses. Also considering the fact that in table 3 about 33.7 % respondents do not assess chronically ill patients daily for pressure ulcer symptoms of pressure ulcer, makes the overall result of good practice questionable. The assumption is that private hospitals are usually understaffed; not well equipped as the public hospitals and can hardly send their nurses for continuous education programmes nor encourage them to use new research findings nor practice evidence based nursing care. Like every other private business they want to maximize profit. This assumption is evident in the participants responses about factors that affect the practice and the overall result in this category. With this assumption, the knowledge and practice may not be as good as indicated in this result. However, the result could be authentic in the following reasons; the respondents may just have the head knowledge of what should be, or that respondents were not sincere in their responses. Also most often private clinic hardly accept to admit/nurse chronically or immobile patients or very ill patients. Such patients are usually referred to public hospitals; therefore respondents might have given hypothetical responses and not what they actually do in practice. This calls for another investigation as to whether private clinics in Calabar actually admit at risk patients such as unconscious, the chronically ill and immobile patients.

VII. Conclusion

Knowledge of assessment, prevention and the practice of pressure ulcer prevention is very crucial to quality nursing care of critically ill patients towards the prevention of pressure ulcers. This study had revealed that majority of the nurses working in private hospital in Calabar Metropolis have good knowledge of assessment of pressure ulcer risk factors towards pressure ulcer prevention. Also, the level of practice of pressure ulcer prevention among the nurses was good. However, factors affecting the practice of pressure ulcer prevention included shortage of nurses, lack of utilization of research findings, and poor work attitude of nurses. Based on the findings,

VIII. Recommendations

- Medical Directors/Owners of private should always employ qualified nurses in their clinics.
- Staff of private clinics especially nurses should periodically be sent for continuous education programmes (Seminars and workshops)
- Proprietors should encourage research and application of research findings by staff. Government especially Ministry of Health should ensure that basic criteria for establishing private clinics (e.g. qualified number of staff and necessary equipment) are met by each clinic before giving approval.

Suggestions for further studies

Based on the limitations of the study the following suggestions are made for further studies. Since the scope of this study was limited to private hospitals in Calabar Metropolis, future studies should be expanded in scope to cover other health facilities in Calabar and other states of Nigeria to ascertain whether the knowledge of assessment prevention and practice of pressure ulcer prevention among nurses are the same with private hospitals in Calabar Metropolis.

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