HSOA Journal of Practical and Professional Nursing

Research Article

Perception of Nurses about the Computerized Nursing Records in Selected Primary Health Centres in Jos Metropolis

Oluwatoyin A Ogunyewo[1]*, Emmanuel Adetunji Oyedele[1], Eunice Ari[1], G Onyejekwe[1], Patience Kumzhi[1], Naomi Yakubu[2]

[1]Department of Nursing Science, University of Jos, Nigeria

[2]Kaduna State Ministry of Health, Nigeria

Abstract

Computerized nursing records are becoming a pivot on which the health information processes leverage across countries. It provides the needed data for healthcare planning. It also improves quality of care, accuracy of patients' information or interdisciplinary communication. The study aimed at examining the perception of computerized nursing records among nurses in primary health centers in Jos Metropolis. The study population was nurses working in the primary health centers in Jos Metropolis, Plateau State. A cross-sectional, descriptive, and non-experimental design was used for this study. Data was collected using questionnaire. A total of two hundred and twenty-eight (228) nurses constituted the respondents for this study. Convenience sampling technique was adopted in administering the questionnaire. Two hundred and twenty-eight copies of questionnaire were distributed, and all were retrieved thereby creating the response rate of 100%. The data collected was analyzed using percentages and frequency counts. Findings revealed that majority of the respondents had positive perceptions about computerized nursing records while the 75.5% reveal that they were yet to commence the use of computerized nursing records.

Keywords: Computerized nursing records; Healthcare professionals; Positive outcomes; Secondary health facility

*Corresponding author: Oluwatoyin A Ogunyewo, Department of Nursing Science, University of Jos, Nigeria, E-mail: vicyommie@gmail.com

Introduction

The healthcare delivery system of a nation is anchored on the ability of its health facilities to come up with positive outcomes in the aspect of qualitative and affordable healthcare to its citizenry. In effect, the role of primary health centres in the healthcare delivery system of a nation cannot be overemphasized. Healthcare data play a vital role in the planning, development and maintenance of sustainable healthcare [1,2]. The magnitude and quality of information accessible to healthcare professionals in patient care modify the outcome and continuity of client care. In addition, health information needed for clinical decision making assumes bourgeoning dimension, especially in Lower Middle-Income Countries. The trends show that the health/medical information is poorly designed with the resultant effect on decisions that may lead to clinical errors [3].

Health informatics in Nigeria predates the present times. The starting point was in the late 80s when a collaborative research project was instituted toward creating a synergy between a teaching hospital in Nigeria and some Universities [4]. The product of that collaboration appeared in terms of rudimentary hospital information system based on the Veterans Administration's (VA) Admission Discharge Transfer running on a discrete personal computer which was what the teaching was using during the period under consideration. Part of the projection was that by 2020 all the Teaching Hospitals in Nigeria would have health informatics units that could make use of standardized software. The goal of achieving the feat became watered down due to the affordability challenges that confronted the teaching hospitals in Nigeria. Thereafter, further developments took place as a means of extending knowledge on its design. The purpose of the design was to enhance the referral of patients from one hospital to another. Put differently, information concerning patients could be transmitted over a computer network [5].

Sensitization on the use of computer to document health information and its attendant processes are gaining ground in Nigeria in the present time while on the part of government, there is evolution of plans and strategies toward the espousal of health information technology [1]. Further to this, the Nigerian Government has come up with a 5-year blueprint geared toward creating a potent National Health Management Information System that will serve as a fulcrum for making informed decisions at all levels of health care [1]. The use computer for the documentation and sharing of information is just coming up, and a lot of health facilities are yet to upgrade their information documentation system. The commitment to this will require attitudinal change without which no meaningful breakthrough will be recorded. Against this backdrop, it was necessary to know how nurses perceive the introduction of the computer technology as this will determine their readiness to embrace the change occasioned by this technology.

Objectives

- To determine the perception of nurses about the use of computerized nursing records among nurses in selected health centres in Jos Metropolis

- To determine the perceived factors that could influence the use of computerized records among nurses in selected health centres in Jos Metropolis

Materials and Methods

The study was carried out in selected primary health centres in Jos Metropolis. Eight health facilities were used for this study. Four health centres were selected each from the two local government areas that constitute Jos Metropolis. The study population was nurses working in these health facilities. The population of nurses working in these centres was 250. The nurses are experiencing attrition as there has not been regular replacement of those nurses that have either retired or left voluntarily hence total population sampling was employed. Questionnaire was the instrument used in eliciting their responses. It was segmented into three parts as these include: socio-demographic data, items on perception of nurses about the use of computerized nursing records; and perceived factors that may affect the implementation of computerized nursing records. The instrument was pretested by administering it to nurses in another health setting. A total of two hundred and fifty copies of the instrument were administered but 228 copies were retrieved thus creating 91.2% response rate. The process of administering the instrument entailed seeking permission from the gate keepers. The ethics considerations took the dimension of providing informed decisions in order to obtain their consent. Respondents were given an assurance as to the adherence to the values of confidentiality and anonymity. The right to withdraw without victimization was conceded to them. The data was analyzed by using descriptive statistics.

Results

Table 1 shows that 34 respondents 14.9% were females while 194 (85.1%) respondents are females. Some, 8 (3.5%) of the respondents were between the age category of 20-24 years; 15 (16.5%) respondents were within the age bracket of 25-29; 31 (13.5%) respondents are between the age bracket of 30 – 34 years; 53 (23.3%) respondents are within the age bracket of 35 – 39 years; 55(24.1%) respondents were within the age bracket of 40 – 44 years; 37 (16.3%) respondents were within the age category of 45 – 49 years; 15 (16.7%) respondents were within the age bracket of 50 – 54 while 14 (6.2%) respondents were within the age bracket of 55 – 60 years. The table further reveals that 33 (14.5%) respondents representing 14.5 were single; 172 (75.4%) respondents were married; 3 (1.3%) respondents were divorced while 20 (8.8%) respondents were widowed. Religious distribution reveals that195 (85.5%) respondents were Christians while 30 (13.2%) respondents were Muslims; and 3 (1.3%) respondents 1.3% were Traditional believers. Furthermore, the table further indicates the distribution of the respondents by ethnic affiliation as 9 (3.9%) respondents are Hausa; 21 (9.3%) are Yoruba; 25 (10.9%) are Igbo; 41(17.9%) are Berom; 33 (14.5%) respondents are Ngas; 39 (17.1%) are Tarok; 19 (8.3%) are Afiizere; 11 (4.9%) are Mupun; 11 (4.9%) Amo while 19 (8.3%) are Tiv.

Table 2 shows that 100 (43.8%) strongly agree to the statement that 'computerized nursing records will help patients access and retrieve their health information', 120 (52.6%) of the respondents

		Frequency (F)	Percentage (%)
Gender	Male	34	14.9
	Female	194	85.1
	Total	**228**	**100.0**
Age (Years)	20 – 24	8	3.5
	25 – 29	15	6.5
	30 – 34	31	13.5
	35 – 39	53	23.3
	40 – 44	55	24.1
	45 – 49	37	16.3
	50 – 54	15	6.7
	55 – 60	14	6.2
	Total	**228**	**100**
Marital status	Single	33	14.5
	Married	172	75.4
	Divorced	3	1.3
	Widowed	20	8.8
	Total	228	100
Religion	Christianity	195	85.5
	Islam	30	13.2
	Traditional Religion	3	1.3
	Total	**228**	**100**
Ethnic Groups	Hausa	9	3.9
	Yoruba	21	9.3
	Igbo	25	10.9
	Berom	41	17.9
	Ngas	33	14.5
	Tarok	39	17.1
	Afizere	19	8.3
	Mupun	11	4.9
	Amo	11	4.9
	Tiv	19	8.3
	Total	**228**	**100**

Table 1: Socio-demographic Characteristics of Respondents.

indicated agree to the statement, 4 (1.8%) respondents were undecided, 2 (0.9%) respondents strongly disagreed: 2 (0.9%) disagreed; 207 respondents representing 98.7% agreed that computerized nursing records improves quality of care; 210 (90.9%) of the respondents said computerized nursing records improves communication with other nurses; and reduces patients' cost of health services (92.2%). Majority (90%) of the respondents perceived that computerized nursing records takes care of illegible handwriting of nurses and makes hospital statistics and analysis easier (96%); however, 161 (70.6%) respondents differed on the statement that 'computerized nursing records would not take away most of the time they are to give to patients', 171 (75%) respondents disagreed that computerized nursing records would create more work for them. Majority, 216 (94.8%) perceived that Nurses duty roster would be easier with computerized nursing records while 103 (45.2%) acquiesced to the issue of whether patients' privacy and confidentiality of information would be insecure with computerized nursing records, Majority, 203 (89%) differed on the assertion that 'paper-based records are better than computerized

Perception on computerized nursing records	S A		A		U		S D		D		Total		Mean	SD
	F	%	F	%	F	%	F	%			F	%		
Computerized nursing records will help patients easily access and retrieve their health information	100	43.8	120	52.6	4	1.8	2	0.9	2	0.9	228	100	1.141	199.8
Computer nursing records improves quality of care	110	48.2	115	50.5	3	1.3	0	0.0	0	0.0	228	100	1.037	219.8
Computerized nursing records improves communication with other Nurses	108	47.4	99	43.5	5	2.2	7	3.1	9	3.8	228	100	1.037	219.8
Computerized nursing records reduces patients' cost of health services	106	46.5	104	45.7	9	3.9	5	2.1	4	1.8	228	100	1.075	212.2
Computerized nursing records takes care of illegible hand-writing of Nurses	99	43.5	106	46.5	4	1.7	11	4.8	8	3.5	228	100	1.149	198.4
Computerized nursing records makes hospital statistics and analysis easier	114	50.0	105	46.0	5	2.2	2	0.9	2	0.9	228	100	0.990	230.3
Computerized nursing records will improve the use of stan-dardized nursing languages.	88	38.6	92	40.4	13	5.7	17	7.5	18	7.8	228	100	1.360	167.6
Computerized nursing records will take away most of the time I'm to give to patients	27	11.9	31	13.6	9	3.9	81	35.6	80	35.0	228	100.	4.201	54.2
The introduction of computer-ized nursing record will create more work for me	21	9.3	25	10.8	11	4.9	86	37.8	85	37.2	228	100	5.370	42.5
Nurses' duty roster will be easier with computerized nursing records	111	48.7	105	46.1	3	1.3	5	2.1	4	1.8	228	100	1.026	222.2
Patients' privacy and confi-dentiality will be insecure with computerized nursing records	54	23.7	49	21.5	7	3.1	57	25.0	61	26.8	228	100	2.109	108.1
Paper-based records are better than computerized nursing records	11	4.9	9	3.9	5	2.1	121	53.9	82	35.9	228	100	10.204	22.3
Computer based records should replace paper-based records	119	52.2	101	44.3	3	1.3	2	0.9	3	1.3	228	100	0.957	238.2
Computer based records should be used together with paper-based records	89	39.1	77	33.8	6	2.6	28	12.3	28	12.3	228	100	1.278	178.4

Table 2: Respondents' perception on computerized nursing records.

nursing records. of the respondents (82%) perceived that computer-ized nursing records are better than paper-based records, 220 (96.5%) agreed to the item that 'computerized nursing records should replace paper-based records' while 116 (72.8%) were of the opinion that com-puterized nursing records be used together with paper-based records.

Table 3 reveals that 155 (67.9%) were affirmative about the state-ment that 'poor government policy and strategy affects the implemen-tation of computerized nursing records' while 73 (32.1%) differed; 182 (79.8%) agreed to the statement that 'lack of basic ICT knowl-edge and skills affects the implementation of computerized nursing record's while 46 (20,2) dissented; 190 (83.4%) upheld the assertion that 'poor internet connectivity affects the implementation of com-puterized nursing records in PHC' while 38 (16.6%) differed; 171 (75%) subscribed to the statement that 'financial constraint affects

the implementation of computerized nursing records in PHC' while 57 (25%) disagreed; 146 (64.1%) agreed that to the assertion that 'in-adequate electric supply affects the implementation of computerized nursing records in PHC' while 82 (35.9%) differed.

Discussion

The socio-demographic findings reveal that majority of the re-spondents were females who were married and were between 31-52 years. Majority of them are Christians, and hail from different ethnic groups in the Plateau State. Majority of the respondents have been working for about 11-30 years. However, the mean years of working experience is about 18years. The study reveals the preponderance of females in nursing, and majority of whom are Christians. Jos me-tropolis is a Christian dominated location. Furthermore, the teaching

Perceived factors that may affect the use records computerized nursing	Yes		No		Total	
	F	%	F	%	F	%
Poor government policy and strategy affects the implementation of computerized nursing records in PHC	155	67.9	73	32.1	228	100
Lack of basic ICT knowledge and skills affects the implementation of computerized nursing records in PHC	182	79.8	46	20.2	228	100
Poor internet connectivity affects the implementation of computerized nursing records in PHC	190	83.4	38	16.6	228	100
Financial constraint affects the implementation of computerized nursing records in PHC	171	75.0	57	25.0	228	100
Inadequate electric supply affects the implementation of computerized nursing records in PHC	146	64.1	82	35.9	228	100

Table 3: Respondents' distribution on perceived factors that affect the implementation of computerized nursing records in Primary Health Centers.

hospital is located in the State where majority of the residents are Christians and are Plateau indigenes [6]. This finding aligns with who indicated that Jos is Christian dominated area [6]. The study found that majority of the respondents had positive perception about the impact of computer nursing records on patient care. Most of the respondents perceived that standardized EHR improves quality of care. This finding is consistent with the findings of Adeleke et al., [1] in a study among healthcare providers at National Hospital, Abuja who reported that virtually, all healthcare professionals in the study, which included nurses indicated that Information Communication Technology (ICT) would improve medical care quality. Similarly, majority of the respondents perceived that computerized nursing records would help patients easily access and retrieve their health information. Majority of the respondents perceived that computerized nursing records improve communication with other healthcare providers. This assertion finds its support in Alpert [7] which emphasizes that computerized system makes it possible for the services a patient needs-office visits, testing, surgery, hospital visits and so on to be coordinated and scheduled over the course of a single visit, rather than time-consuming multiple visits. There was a preponderance of the respondents who perceived that computerized nursing records reduce patients' cost of health services. This is similar to the finding of Devkota et al. [5] indicating that widespread implementation of electronic health system decreases healthcare expenditure, and improves patient safety, and healthcare efficiency and outcomes. Most of the respondents perceived that standardized EHR takes care of illegible handwriting of Nurses. This finds its support in Robin [8] which indicated that computerized documentation systems could improve nurses' access to more complete, accurate, legible and up-to-date patient data.

The study found that more than half of the respondents perceived that computerized nursing records would not take away most of the time they are to give to patients. Put differently, the care time dedicated to patients would not be compromised. Most of the respondents perceived that the introduction of computerized nursing records would not create more work for them. This is consistent with Aldosari et al., [9] indicating that a strong positive correlation exists between usefulness and perceived ease of use electronic medical records thereby resulting in a positive effect on nurse's acceptance. Most of the

respondents perceived that nurse's duty roster would be easier with computerized nursing records. More than half of the respondents were not in agreement claiming that patients' privacy and confidentiality of information would be insecure with computerized nursing records. However, this assertion contradicts Terry et al., (2019) which indicates that electronic medical records in Canadian primary health care practice resulted in an expansion of the availability of data. Majority of the respondents perceived that computerized nursing records were better than paper-based records and should replace paper-based records or they should be used together with paper-based records. This could be as a result of its perceived benefits such as decreased costs, easy accessibility, and legibility of health records among others. This finding aligns with Devkota et al., [5], Robin [8]. Findings further indicate that majority of the respondents perceive poor government policy and strategy affects the implementation of computerized nursing records in primary health centres. This is in line with the position of Benson [10] who suggested that government policies might constitute the major barriers hindering the adoption of electronic patient record in Nigeria. The World Health Organization, [11] indicated the need for a robust government policy on healthcare technologies in Nigeria to facilitate the implementation of e-health initiatives. Majority of the respondents perceived that lack of basic ICT knowledge and skills affects the implementation of computerized nursing records in primary health centres. This finding is consistent with Ouma et al., [12] that identified inadequate ICT infrastructure as one of the barriers for computerized nursing records implementation. This is required to enhance the knowledge and training of the personnel while in contrast, the developed countries parade adequate healthcare infrastructures with overwhelming financial support from their governments [13]. Majority of the respondents perceived that poor internet connectivity affects the implementation of computerized nursing records in the primary health centres. This finds its support in Nigeria Research Council [14], Edward et al., [15], who asserted that the low speed and costly internet bandwidth in Nigeria will affect the actualization of the computerized nursing records as high bandwidth is needed for accessing and transmitting large images. Majority of the respondents perceived those financial constraints affect the execution of computerized nursing records in the primary health centres. Martinez et al., [16] asserted that implementation of the computerized nursing records is not cost effective as large amounts are required for the logistics involved. Majority of the respondents perceived that inadequate electric supply affects the implementation of computerized nursing records. Erratic power supply has been found as an element that impedes the successful outcomes of this computerized technology. Stable electricity is required to ensure the optimal functioning of the System [10].

Conclusion

The relevance of this study cannot be discountenanced as the health care services are getting more technologically-driven. Computerized health records system is an integral part of this technology. It is highly valued in primary health care as these remains the grass root health services. The rural population health challenges and dynamics need to be well documented in order to meet their expectations in terms of profiling. The attendant challenges notwithstanding, the collateral advantages are enormous as to adopt this innovation.

References

1. Adeleke IT, Erinle SA (2015) Health information technology in Nigeria: Stakeholders' perspectives of nationwide implementations and meaningful use of the emerging technology in the most populous black nation. American Journal of Health Research 3: 17-24.

2. Terry AL, Stewart M, Cejic S (2019) A basic model for assessing primary health care electronic model record data quality. BMC Medical Informatics and Decision-Making 19: 30.

3. Garba KD, Harande YI (2018) Significance and challenges of medical records: A systematic literature review: ISST Journal of Advances in Librarianship 9: 26-31.

4. Idowu P Cornford D, Basha L (2008) Health information deployment in Nigeria. Journal of Health Informatics in Developing Countries 2: 1.

5. Devkota B, Devkota A (2013) Electronic health records: Advantages of use and barriers to adoption. Health Renaissance 11: 181-184.

6. Jacob S (2015) Impact of Jos crises on patt0065rn of students/teachers' population in schools and its implication on the quality of teaching and peaceful co-existence in Nigeria. World Journal of Education 5: 30-41.

7. Alpert J (2016) The electronic medical record in 2016: Advantages and disadvantages. Digit Med 2: 48-51.

8. Robin H (2017) Benefits of using an electronic record. Nursing Critical Care 42: 9-10.

9. Aldosari B, Mansour SA, Aldosari H, Alanazi A (2018) Assessment of factors influencing nurses' acceptance of electronic medical records in a Saudi Arabia Hospital. Informatics in Medicine Unlocked 10: 82-88.

10. Benson AC (2011) Hospital information systems in Nigeria: A review of literature. Journal of Global Healthcare Systems 1: 1-26.

11. World Health Organization (2020) Country Health Systems Profiles: Nigeria. World Health Organization. Regional Office for Africa, Republic of Congo.

12. Ouma S, Herselman ME (2009) E-health in rural areas: Case of developing countries. International Schorlarly and Scientific Research and Innovation 2.

13. Sood S, Nwabueze SN, Mbarika AWA, Prakash N, Chatterjee S, et al. (2008) Electronic medical records: A review comparing the challenges in developed and developing countries. In Hawaii International Conference on System Sciences.

14. National Research Council (2000) Networking Health: Prescriptions for the Internet. National Academies Press, Washington, USA.

15. Edward MI, Iwaola OM, Adumaza FB, Fayose OE (2020) Factors affecting implementation of computer-based clinical documentation among nurses in selected hospitals, Akure, Ondo State. British Journal of Computer, Networking and Information Technology 3: 7-18.

16. Martínez A, Villarroel V, Seoane J, del Pozo F (2015) Analysis of information and communication needs in rural primary health care in developing countries". IEEE Transactions on Information Technology in Biomedicine 9: 66-72.

Advances In Industrial Biotechnology | ISSN: 2639-5665

Advances In Microbiology Research | ISSN: 2689-694X

Archives Of Surgery And Surgical Education | ISSN: 2689-3126

Archives Of Urology

Archives Of Zoological Studies | ISSN: 2640-7779

Current Trends Medical And Biological Engineering

International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X

Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276

Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292

Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370

Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594

Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X

Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562

Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608

Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879

Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397

Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751

Journal Of Aquaculture & Fisheries | ISSN: 2576-5523

Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780

Journal Of Biotech Research & Biochemistry

Journal Of Brain & Neuroscience Research

Journal Of Cancer Biology & Treatment | ISSN: 2470-7546

Journal Of Cardiology Study & Research | ISSN: 2640-768X

Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943

Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771

Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844

Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801

Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978

Journal Of Cytology & Tissue Biology | ISSN: 2378-9107

Journal Of Dairy Research & Technology | ISSN: 2688-9315

Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783

Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X

Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798

Journal Of Environmental Science Current Research | ISSN: 2643-5020

Journal Of Food Science & Nutrition | ISSN: 2470-1076

Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X

Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566

Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485

Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662

Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999

Journal Of Hospice & Palliative Medical Care

Journal Of Human Endocrinology | ISSN: 2572-9640

Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654

Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493

Journal Of Light & Laser Current Trends

Journal Of Medicine Study & Research | ISSN: 2639-5657

Journal Of Modern Chemical Sciences

Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044

Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X

Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313

Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400

Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419

Journal Of Obesity & Weight Loss | ISSN: 2473-7372

Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887

Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052

Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X

Journal Of Pathology Clinical & Medical Research

Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649

Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670

Journal Of Plant Science Current Research | ISSN: 2639-3743

Journal Of Practical & Professional Nursing | ISSN: 2639-5681

Journal Of Protein Research & Bioinformatics

Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150

Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177

Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574

Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060

Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284

Journal Of Toxicology Current Research | ISSN: 2639-3735

Journal Of Translational Science And Research

Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193

Journal Of Virology & Antivirals

Sports Medicine And Injury Care Journal | ISSN: 2689-8829

Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: https://www.heraldopenaccess.us/submit-manuscript

---