



DEVELOPING AND VALIDATING A MEASUREMENT INSTRUMENT FOR THE EFFECTS OF E-GOVERNANCE ON HEALTH RECORD MANAGEMENT PRACTICES: A PILOT STUDY.

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ABSTRACT: *An essential aspect of empirical research is the development of an appropriate measurement scale, which will further be used in the main study. As a result of this, the paper is a pilot study that developed and validated a questionnaire for measuring three constructs: e-governance in health, referral and record management practices titled EGHRM, with a sample size of 92 respondents in a health facility. The items that made up the measurement scale were adapted from various studies that underwent content validity by three experts, composite and Cronbach's alpha reliability, convergent validity using average variance extracted, and discriminant validity tests were done using SPSS and Microsoft Excel. The results of these various tests met the relevant and acceptable threshold found in extant literature, making the instrument valid for future data collection.*

KEYWORDS: E-governance, Health Record Management, Instrument, Pilot Study.



INTRODUCTION

Records serve as memories of our daily activities; due to this, institutions be they public or private need records in order to function efficiently. As a result, of this proper records management deals with how records are created, received, maintained, used, and finally disposed (Oseni et al., 2023). Wakumoya (2016) defines records management as the professional management of information in physical form from the time records are received or created through their processing, distribution, and placement in a storage and retrieval system until either eventual elimination or identification for permanent retention in the archives. Additionally, the International Records Management Trust [IRMT] (2009) sees records management as the task of ensuring that all recorded information, regardless of form and medium, is managed in a proper and efficient manner to enhance effective service delivery to the end users. It is therefore seen as a complete process consisting of identifying, classifying, prioritizing, storing, securing, archiving, preserving, retrieving, tracking, and destroying records which is referred to as a comprehensive and complete cycle of record management (Adegboyega & Musa, 2019).

The adoption of e-governance within the field of record management has brought about reliable and effective record management. This is through using information communication technology for the creation of various record management platforms in different sectors which enhances record management practices (Yusuf, 2014). This has come to be known as Electronic Record Management (ERM) with various modifications for the specific needs of any institution irrespective of the sector.

This study is designed as a pilot study for ascertaining the reliability and validity of an instrument for survey research which will collect data on e-governance in health, referral, and record management practices as variables. Given that the pilot study adapted scales from other literatures; Ogungbade and Abdul (2022), Kim et al. (2017), and Ihedioha et al. (2021) which were paraphrased to suit the context of the current study, there exist the need to ascertain for validity, internal consistency and operational efficiency of these modified scales making it worthy as an appropriate instrument for future data collection. A pilot study is essential as it give the research an overview of possible challenges that might arise in the course of the main study, this study was conducted using a small group in a different institution with similar characteristics to that of the main study.

LITERATURE REVIEW

E-governance and Record Management Practices

According to Agu et al. (2020), an effective records management program should have in place systems, manual or automated, that can locate and retrieve records in a reliable and timely fashion to meet the needs of users. Record management, especially in healthcare institutions which is known as health record management, is critical for effectiveness, efficiency, and general quality of health care services provided. It serves as the basis upon which the health condition of a patient is managed as it entails the timely creation, storing, retrieval, and even transferring of a patient. The use of e-governance has revolutionized health service delivery as



the application of e-governance tools brought about the utilization of electronic means of handling health record practices. Within the medical field this has come to be known as the Electronic Health Record Management System [EHRMS].

Joseph et al. (2020) avers the major advantage of adopting the electronic-based patient records is their vast possibility of strengthening the linkage between the clinical records on one hand and the management information system on the other hand so that resources used and quality of medical services rendered can be analyzed using clinical data. EHRMS is a replacement for the paper form of managing health records. It can be installed not only on computers but also on web-based platforms and smart mobile phones making the software i.e., EHRMS, compatible with various devices. Furthermore, the introduction of mobile computing and wireless communication technologies, applications are now designed to run on smartphones and to use sensor networks to monitor patients in real-time. Healthcare professionals can access all the relevant or needed data through many computer interfaces (Daniel, 2020; Daryl, 2015).

One major advantage of this is it allows for the modification or management of patient records on-the-go and irrespective of users' preferences of time or location.

E-governance and Referral

Government exists for the provision of basic services such as health care, among others; the adoption of government information and communication technology for the provision of such services has come to be known as e-governance. According to Derindag et al. (2019) the providing of governmental services through the utilization of information and communication technology (ICT) is referred to as e-governance.

Generally, there are various levels of health care services; these levels are categorized in three: primary, secondary and tertiary health care services. These categories play the basic functions of preventive, curative, and advanced medical services including research for advancing health care; this categorization further influences the capacity and capability of each. In line with this, Nguru (2022) expressed that many health systems in the world have different levels. The hierarchy leads to the transfer of a patient from a lower or unspecialized health provider to a higher health facility that provides specialized health care. Patients needing care ideally first visit the primary health care which is the first point of contact for medical services and depending on the condition of the patient, they could be transferred for further treatment (Makhavhu et al., 2024).

This has come to be understood as a referral, which is seen as a written request for specific medical services from the patient's primary care physician to specialists regarding their illness. The referral could be done due to a lack of or insufficient drugs, equipment, or skills. It has over time become an important aspect of health service delivery, as about five percent of treatment in primary health care delivery is accounted for by patient referral (Forrest et al., 2006; Keleher, 2019). In the event that a doctor wanted to refer a patient to another clinic or a hospital, the diagnostic information and clinical notes needed to be printed or handwritten on paper and then sent to the new doctor to be involved for further analysis and examination (Joseph et al., 2020). Although, the World Health Organization has provided referral guidelines. Kalume et al., (2022) countries such as Rwanda, South Africa, Ghana, and the Philippines, to mention a few have additionally developed their own referral guidelines to ensure appropriate transfer of patients for specialized and advanced care.



The use of e-governance for referral has given birth to the idea of electronic referral, also known as e-referral. In simple terms e-referral is seen as using information and communication technology tools for transferring a patient to another health facility. This helps in improving the health care process through the elimination of uncompleted referrals and delays. Notwithstanding, the need for health data sharing and access electronically is in line with the need for data security that goes in line with the principles of confidentiality, integrity, and availability (Daniel et al., 2020).

METHODOLOGY

According to In (2017), prior to conducting a pilot study it is necessary for the researcher to have a deep understanding of the reason for the study, research question, and methodology to be used in the main study. This will allow for having an insight into the possible challenges that might be faced in the main study and solutions to be proffered. Additionally, it assists in clarifying any misunderstanding of the measurement scales to be used for the main study (Abdulkarim et al., 2021). Hill (1998), as cited by Johanson and Brooks (2009), expressed that a sample size of 10-30 is sufficient for a survey research pilot study and for instrument development. Hertzog (2008) recommended a sample size of 25-40. There is the need for samples to be large and an actual representation of the original study so as to arrive at an accurate parameter to be used for measurement (Johanson & Brooks, 2009); this will enable reliable data and generalization from the study. It has been argued that there is no consensus on the exact number of sample size to be used in a pilot study, however scholars have used an adequate number of sample size ranging from 100-200 and a recommended standard ratio of 5:1 item ratio of participant to items of variables (Carpenter, 2017). This pilot study therefore consists of 100 sample size which at the same time satisfies the 5:1 item ratio.

Adapted Questionnaire

Items that made up the measurement scale for each variable, i.e., e-governance in health, referral and record management practices, were adapted from other researches that have measured the same variable under study. The adaptation allows for the modification of the items to align within the context of the current study. E-governance in health, referral, record management practices was adapted from Ogungbade and Abdul (2022), Kim et al. (2017), and Ihedioha et al. (2021) respectively.

Table 3.1.1

SN	Variable	Source	Number of Items
1.	E-governance	Ogungbade and Abdul (2022)	6
2.	Referral	Kim et al. (2017)	4
3.	Record Management Practices	Ihedioha et al. (2021)	7
Total			17

Source: *Authors' design, 2026*

Table 3.1.1 above represents the variables, their sources and the number of items within the original measurements prior to content validity.



The drafted measurements were modified and sent to specialists with relevant scientific publications and experience within the field for their expert judgements (Roebianto et al., 2023). This was sent to two professors at the University of Maiduguri and an IT expert with years of both academic and professional experience for their opinion and rating. This goes in line with the minimum of experts required for content validity (Lynn 1986).

The content-validated items were used to design a closed-ended questionnaire guided by a 5-point Likert scale and were distributed to 100 respondents in a different institution having similar characteristics with that of the main study. The questionnaires were distributed with the aid of 3 research assistants to help in ensuring a high response rate, after 3 weeks of following up with the respondents 92 completed questionnaires were retrieved and subjected to reliability test.

Internal Consistency Reliability

Cronbach's Alpha was first used to assess the internal consistency of the number of items for each variable. This was done by comparing the number of covariance or shared variance among the items making up an instrument to the amount of overall variance. When the value of Cronbach's Alpha rises after a particular item is deleted, then it indicates such an item does not fit in measuring the latent construct (Collins, 2007).

The 6 items for e-governance within the health sector serving as a measurement scale had an initial Cronbach's alpha of .675; after deleting a particular item, it improved to .703. Similarly, while testing for the internal consistency for the referral scale, 4 items were adapted. The test gave a Cronbach's alpha of .762. The test for record management practices within the health sector scale adapted 7 items. The initial test gave a Cronbach's alpha of .629; to improve on the measurement, an item was deleted. When tested for the second time the Cronbach's alpha was at .705

The internal consistency of the scale was further subjected to a composite reliability test with the values .765, .785, and .878 for the variables e - governance, referral, and record management practices respectively.

Table 3.2.1

SN	Variable	Cronbach's Alpha	Composite Reliability	No. of items
1.	E-governance	.703	.790	5
2.	Referral	.762	.785	4
3.	Record Management Practices	.705	.878	6
Total				15

Source: research data, 2026

Table 3.2.1 above shows the reliability for each measurement scale having .703, .762 and .705 which falls within the acceptable range of reliability (George & Mallery, 2003). The acceptable composite reliability ranges from 0.6 to 0.7, while values ranging from 0.7 to 0.9 can be categorized as good reliability (Mokobombang & Kusumawati, 2023). While the Cronbach's alpha was calculated in SPSS, the Composite reliability was calculated in Microsoft Excel



using λ , λ^2 and $1 - \lambda^2$ where λ represents the rotated component matrix value of each variable arrived at using SPSS.

Convergent Validity

Convergent validity measures the degree to which various items statistically relate to the same variable. It is essential as it helps in measuring a construct that can be measured in various ways; this is done through ensuring different items converge as true indicators of the construct under measure (Lim, 2024). In developing this instrument, convergent validity for the variables was determined using Average Variance Extracted (AVE) in Microsoft Excel, i.e the sum of a variable λ^2 divided by its total number of items. AVE is used to represent the average amount of variance that a construct explains in its indicators relative to the overall variance of its indicators (Cheung et al., 2024).

Table 3.3.1

SN	Variable	Average Variance Extracted	No. of Items
1	E-governance	.490	5
2	Referral	.551	4
3	Record Management Practices	.551	6

Source: research data, 2026

Table 3.3.1 above shows the AVE for the three variables to be .490, .551, and .551. Ho et al. (2020) argued that an AVE value of more than 0.40 is acceptable if the composite reliability value is adequate. Table 3.2.1 indicates the composite reliability of the said variable as .790; this makes the AVE value of .490 sufficient. Additionally, Lam (2012) avers that if the composite reliability is above .60 but the AVE is less than .50, the research is worthwhile. Although Cheung et al., (2024) highlighted that for an acceptable level of convergent validity, the AVE value should not be less than 0.5.

Discriminant Validity

Discriminant validity measures the extent to which different items (i.e; measurement scale)are separate and not highly correlated. This ensures that each variable is uniquely measured appropriately. While discriminant validity focuses on the separateness and specificity of different variable, convergent validity is concerned with the unity among measures of the same variable (Lim, 2024).

Table 3.4.1

Construct	E-governance	Referral	Record Management Practices
E-governance	0.700		
Referral	0.444	0.742	
Record Management Practices	0.552	0.605	0.742

Source: research data, 2026



Table 3.4.1 above shows that the items measure different constructs; with this it is suffice to say each construct is more related to its own indicators than to others, meeting the requirement for discriminant validity. Discriminant validity is present when the square root of the AVE for each construct is greater than the construct's highest correlation with any other construct (Lim, 2024).

CONCLUSION

This pilot study adapted constructed from various sources and modified them to be able to fit with the context of the future study. This leads to the development of an instrument EGHRM, which will allow for the collection of accurate and consistent primary data. EGHRM serves as a single inclusive instrument for e-governance, referral and health record management practices within the Nigerian context.

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