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STATISTICAL APPROACH IN EXPLORING FACTORS OF DOCUMENTATION PROCESS AND HOSPITAL PERFORMANCE: A PRELIMINARY STUDY

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ABSTRACT

Background: In recent years, hospitals have revealed the importance of documentation; whereas, it was impossible to attain without standardization of processes which enhanced performance.Hospitals with poor documentation disproportionately affect patients' health. In documentation, follow-up and consistency are the required elements for enhanced performance. Whereas, inpatient claims quality indicators, cause of death for mortality cases, co morbidities, and complications. Similarly, outpatients claim financial impact, regulatory requirements, and denials of deficient documentation. Effective documentation for health-care is believed as imperative which has legal, practical embodiment, and fundamental for organizational efficiency. Empirical studies proved that documentation usually carried out without careful assessment, paying close attention, and critical thinking, which devastate health-care. Meanwhile, improved documentation reduces queries and restricts the disruptions which permit organizations to focus on improvements. **Objective:** The study aimed to explore the factors which affect the documentation process and hospital performance. **Materials and Methods:** A quantitative research with structured questionnaire was carried out with simple random sampling with 100 sample size. Furthermore, Exploratory Factor Analysis (EFA) with Varimax rotation was conducted through Statistical Package for Social Sciences (SPSS) for scales' validation. **Results and Conclusion:** The key findings found that variable named; "documentation process" came up with nine items and two dimensions (stock procedures and prompt and accurate recording). Whereas, variable named; "hospital performance" comprised 12 items and two dimensions (cost minimization and service quality). Lastly, the reliability test results proved the higher degree of internal consistency with Cronbach's Alpha values > 0.70.

Keywords: *Exploratory Factor Analysis, Hospitals, Documentation Process, Hospital performance, Pakistan*

1. INTRODUCTION

Documentation is a process of ascertaining a narrative for information decision support tools [1, 2]; which assist in services reimbursement and serves as legal record, and repository for data analysis [3]. Moreover, today's world brought a challenge of consistent quality deliverance which could be made easy through document process standardization [4]. Standardization is beneficial to integrate and to identify strategies for quality based performance [5, 6]. Quality of documentation provides deep insight into the best limitations and practices, and outcomes [7]. Furthermore, good quality of documentation has three attributes; format or structure, documentation process and content. The format or structure includes completeness and legibility of information; the process emphasize on regularity and completeness of recorded data; whereas, documentation content emphasize on accuracy and completeness of data by reflecting reality [8]. Jang and Lee (1998) stated that standardization is characterized as the degree to which operating procedures, policies, and work rules are distinguished and implemented [9]. Moreover, due to standardization a set of well-defined tasks become part of routine processes. Standardized documentation is also a source to minimize variations in tasks completed by multiple people [4]. Moreover, many companies invest significant amount of money and time to improve their documentation process for consistent operations. Consequently, consistency makes easier to control processes and augment hospital performance [4]. Moreover, enhanced performance needs manager's great deal of interest to improve documentation [10]. On the other hand, poor documentation leads to inadequate information, which can affect hospital performance [11].

In recent years, hospitals have also revealed the importance of documentation process in hospital performance; whereas, it was impossible to attain without standardized documentation tools [12]. Moreover, establishing an enhanced performance needs penalty of adequate, efficient and standardized documentation tools [13, 14]. Hospitals with poor documentation will disproportionately affect patients' health [15]. Moreover, documentation follow-up and consistency are the required elements for enhanced performance [6]. According to King (2013),quality indicators for inpatients are: cause of death and cause ofcomplications [16]. Similarly, for outpatients: financial impact, regulatory requirements, and denials of deficient documentation [6]. Because of this, effective documentation in health-care is believed as imperative

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which has legal, practical embodiment, and fundamental for organizational efficiency. Empirical studies proved that documentation usually carried out without careful assessment, paying close attention, and critical thinking, which devastate health-care of patients [17]. Literature also highlighted that organizations affected badly by poor documentation and involve shortage of pure guidelines work overload, mismatches among staffing resources, time limitations, and repetitions [18, 19]; whereas, improved documentation reduce queries and restrict the disruptions which permit organizations to focus on improvement of performance [20]. Furthermore, effective documentation process is needed for better performance due to quality of care, shared savings program, bundle payments, and risk adjusted payment models [21].

2. MATERIALS AND METHODS

The Exploratory Factor Analysis (EFA) was conducted to validate the items in questionnaire by using Statistical Package for Social Sciences (SPSS) to find the relationship between common variances shared between items and the individual item variances. Moreover, Factor Analysis measured the ratio of an item's unique variance to its shared variance (Communalities). Furthermore, Samuels (2016) argued that if dealing with sample for further analysis then Principal Axis Factoring should be used [22]. Researchers used orthogonal rotation rather oblique as oblique rotation is more difficult to interpret and should only be used if the solution out of orthogonal is not acceptable [23]. However, the purpose of using EFA is to use fewer variables from multidimensional data set [22]. Therefore, Principle Axis Factor analysis with Varimax rotation was conducted to assess the underlying structure for the nine items. As Varimax is orthogonal rotation and forces the factors to be independent of each other. In Varimax (orthogonal rotation) the final factors will be as uncorrelated as possible to each other. As a result, assumption could be made that the information explained by one factor is independent of the information in the other factors. Moreover, factor rotation was utilized which is easier to interpret and rotation explained or predicted different items by different underlying factors. Each factor explains more than one item and called simple structuring. In reality, this is not always achieved. One thing to look for in the rotated matrix of factor loadings is the extent to which simple structure is achieved.

2.1 Quantitative data collection: According to Salkind (2011), conducting a survey is a common method and is widely used for data collection [24]; whereas, questionnaire method is the best method [25]. For this reason, close ended questionnaire on five point likert scale was used to collect data.

2.2 Target population and sampling technique: Selected target population was Basic Healthcare Unitslocated in the Divisions of Rawalpindi and Sahiwal (Pakistan). Furthermore, simple random sampling was utilized and 100 respondents were used to generalize the observed characteristics [26].

3. RESULTS AND DISCUSSION

Table 1: The table presents KMO and Bartlett's Test.

		Documentation Process	Hospital Performance
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.880	.849
Bartlett's Test of Sphericity (Sig.)	Approx. Chi-Square	441.011	1014.540
	Df	36	91
	Sig.	.000	.000

For sample adequacy, a test of Kaiser-Meyer-Olkin (KMO) was conducted to assess sample size adequacy. Results in Table 1 expressed that the KMO score for documentation process was 0.880 and 0.849 for hospital performance which is adequate enough as is > 0.6 and considered fit for factor analysis [27, 28]. Furthermore, Bartlett test of Sphericity was significant (Chi-square=441.011; and 1014.540 respectively with p-value < 0.000) which indicates that the sampling provided realistic basis and was acceptable to proceed with factor analysis [29, 27].

Table 2: The table presents Total Variance Explained.

Documentation Process						
Factor	**Initial Eigenvalues**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	4.398	48.863	48.863	3.196	35.508	35.508
2	1.837	20.410	69.273	2.255	25.052	60.559
Hospital Performance						
Factor	**Initial Eigenvalues**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	6.278	44.840	44.840	4.669	33.349	33.349
2	2.911	20.793	65.633	3.774	26.960	60.309

Principal Axis Factoring was utilized as extraction method. The Total Variance Explained showed in Table 2 explains that how the variance was divided among possible factors. For documentation process and hospital performance, the first two factors were extracted with Eigenvalues greater than 1.0, which is a common criterion for a factor to be retained [30]. Many researchers do not consider the factors with eigenvalues less than 1.0 as the information gained from such factors explains less information to justify keeping that factor [23]; and tend to cause over extraction [31]. Moreover, these extracted two factors for each variable contributed a total of 60.559 percent and 60.309 percent of the change in total variance for documentation process and hospital performance respectively.

Table 3: The table presents Communalities and Rotated Factor Matrix.

No.	Item Statements	Com*	1**	2**
	Documentation Process			
1	Does the current stock procedure system satisfy you?	.666	.844	
2	Does your organization have regular inventory record update?	.694	.816	
3	Is there any inventory item in the warehouse which is overstocked due to delay in postings?	.497	.808	
4	Do you agree that documentation effects performance?	.757	.710	
5	Does your organization frequently review inventory reports and procedures?	.579	.676	
6	Your organization does often perform stock taking activity precisely?	.595		.753
7	Does health-care facility consume accurate, reliable, timely and useful stock documentation for decision making?	.633		.730
8	Does the current inventory recording system satisfy you?	.497		.720
9	Have you experienced discrepancies between actual and physical stock balances?	.533		.660
	Hospital Performance			
1	In case of stock-outs, our organization frequently goes with hasty buying which involves cumbersome cost?	.907	.930	
2	Do you agree that cost at the expense of stocked-out affects hospital performance?	.867	.926	
3	Existing systems create challenges to the organization?	.733	.819	
4	Do you have any expired, obsolescence and damaged items in stores?	.624	.769	
5	We have the ability to reduce our costs?	.587	.758	
6	Do you determine optimization?	.568	.754	
7	Overall productivity is being achieved by your organization?	.466		
8	In your organization bed occupancy rate (BOR) is high?	.656		.804
9	In your health-care facility mortality rate is decreasing from year to year?	.606		.770
10	The stock handler people are essential part for quality deliverance?	.602		.723
11	The number of X-rays, scanning, and lab test equipments are meeting the required patients' demands?	.521		.712
12	The number of deliveries is high and is being met?	.506		.703
13	Through effective mechanisms, your organization can help the clients efficiently?	.453		.626
14	You have attained the performance which permits product availability?	.347		

*Communalities; **Rotated Factor 1; **Rotated Factor 2.

In Table 3 each item for documentation process and hospital performanceshowing scores well above the threshold value (>.2) and meeting the assumptions to retain the items at this stage [32]; which shows that the communalities scores will not signify additional factors.Table 3 also contains the factor loadings for nine items of documentation process and fourteen items of hospital performance; which are separated into two factors; namely Factor 1 and Factor 2. For documentation process Factor 1 constituted 5 items; while Factor 2 constituted 4 items and hospital performance has seven itemsin Factor 1 and seven items in Factor 2. Within each factor, the items were sorted from the one with highest factor weight or loading for that factor to the one with lowest factor loading. Eventually, two retained factors each for documentation process and hospital performancehaving more than three items for each factor with loadings >0.60 [33]. Since each item has a loading greater than |.60|except item7 and item14 (factor loadings are < 0.60) of hospital performance; all the items were retained but item7 and item14 were deleted. Thus, the total number of items under the construct documentation process was nine and two factors were identified whereas, under the construct hospital performance was 12 and two factors were identified after the analysis. Hereafter, the factors were renamed to reflect the items as shown in Table 4.

Additionally, the results also represented that the factor loadings are significant at 0.01 levels as the factor loading score greater than 0.512 with a sample size of 100 remains significant at the 0.01 level [34, 35]. Furthermore, a factor with factor loadings greater than 0.60 for four factors is considered as stable for sample size greater than 50 [36].

Table 4: The table presents the Renamed Factors Resulted from EFA Procedure.

Factor	Item	Statement
Documentation Process		
Stock Procedures	1	Does the current stock procedure system satisfy you?
	2	Does your organization have regular inventory record update?
	3	Is there any inventory item in the warehouse which is overstocked due to delay in postings?
	4	Do you agree that documentation effects performance?
	5	Does your organization frequently review inventory reports and procedures?
Prompt and Accurate Recording	6	Your organization does often perform stock taking activity precisely?
	7	Does health-care facility consume accurate, reliable, timely and useful stock documentation for decision making?
	8	Does the current inventory recording system satisfy you?
	9	Have you experienced discrepancies between actual and physical stock balances?
Hospital Performance		
Cost Minimization	1	In case of stock-outs, our organization frequently goes with hasty buying which involves cumbersome cost?
	2	Do you agree that cost at the expense of stocked-out affects hospital performance?
	3	Existing systems create challenges to the organization?
	4	Do you have any expired, obsolescence and damaged items in stores?
	5	We have the ability to reduce our costs?
	6	Do you determine optimization?
Service Quality	7	In your organization bed occupancy rate (BOR) is high?
	8	In your health-care facility mortality rate is decreasing from year to year?
	9	The stock handler people are essential part for quality deliverance?
	10	The number of X-rays, scanning, and lab test equipments are meeting the required patients' demands?
	11	The number of deliveries is high and is being met?
	12	Through effective mechanisms, your organization can help the clients efficiently?

Table 4 showed that EFA brought two factors for each variable. The researchers renamed each factor with a suitable name. For constructs of Documentation Process, Factor 1 renamed as Stock Procedures and Factor 2 as Prompt and Accurate Recording. However, for constructs of Hospital Performance, Factor 1 renamed as Cost Minimization and Factor 2 as Service Quality.

Table 5: The table presents Test of Reliability.

Variables	N of Items	Cronbach's Alpha (*N*=100)
Documentation Process	**9**	**.863**
Stock Procedures	5	.891
Prompt and Accurate Recordings	4	.822
Hospital Performance	**12**	**.893**
Cost Minimization	6	.927
Service Quality	6	.878

The summarized results of Table 5 showed the Cronbach's Alpha value for all variables. The Cronbach's Alpha value for the "documentation process" dimension was (0.86), out of which "prompt and accurate recording" has lowest value (0.82). Meanwhile, "hospital performance" dimension showed (0.89), in which "cost minimization" showed highest value (0.92) compared to other dimensions, while service quality expressed the lowest value (.87). The results expressing the realistic internal higher degree of consistency, reliability and acceptability for this study [38].

5. CONCLUSION

The explored variables found within the bracket of cut-off limits and were further considered for EFA. In EFA, the study found two factors for "documentation process" and two factors for "hospital performance". Two items were deleted from "hospital performance" variable due to low factor loadings.Later on, with the remaining items the factors were renamed according to the association in Factor Rotation Matrix. Consequently, "documentation process" contained factors, named; "stock procedures (five items)" and "prompt and accurate recording (four items)" whereas hospital performance contained factors, named; "cost minimization (six items)" and "service quality (six items)". In the end of this analysis, the reliability of factors was evaluated which came up with the realistic internal higher degree of consistency, reliability and acceptability. Lastly, the study found that the hospitals should integrate the documentation process to avoid high costs and delivering quality of services.

6. REFERENCES

1. Rosenbloom, S. T., Denny, J. C., Xu, H., Lorenzi, N., Stead, W. W., & Johnson, K. B. Data from clinical notes: a perspective on the tension between structure and flexible documentation. *Journal of the American Medical Informatics Association*. 2011; 18(2): 181-186. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3116264/. Accessed 13 June 2019.
2. Mamykina, L., Vawdrey, D. K., Stetson, P. D., Zheng, K., & Hripcsak, G. Clinical documentation: composition or synthesis? *Journal of the American Medical Informatics Association*. 2012; 19(6): 1025-1031. doi: 10.1093/jamia/ocv066.
3. Wilbanks, B. A., Geisz-Everson, M., &Boust, R. R. The Role of Documentation Quality in Anesthesia-Related Closed Claims. *CIN: Computers, Informatics, Nursing*. 2016; 34(9): 406–412.
4. Ungan, M. C. Standardization through process documentation. *Business Process Management Journal*. 2006; 12(2): 135–148.
5. Prideaux, A. Issues in nursing documentation and record-keeping practice. *British Journal of Nursing*. 2011; 20(22): 1450-1454.
6. Reid, A. Improving clinical documentation performance in healthcare: Use of project quality management (Order No. 10125142). 2016; Available: https://search.proquest.com/docview/1807951084?accountid=50217 Accessed 19 June 2019.
7. Akhu-Zaheya, L., Al-Maaitah, R., &Bany Hani, S. Quality of nursing documentation: Paper-based health records versus electronic-based health records. *Journal of Clinical Nursing*. 2017; 27(3-4): e578–e589.
8. Wang, H. Y. Value as a medical tourism driver. *Managing Service Quality: An International Journal*. 2012; 22(5): 465-491.
9. Jang, Y., & Lee, J. Factors influencing the success of management consulting projects. *International Journal of Project Management*. 1998; 16(2): 67-72.
10. Evatt, M., Ren, D., Tuite, P., Reynolds, C., & Hravnak, M. Development and implementation of an educational support process for electronic nursing admission assessment documentation. *Medsurg Nursing*. 2014; 23(2): 89.
11. Wilbanks, B. A. An integrative literature review on accuracy in anesthesia information management systems. *CIN: Computers, Informatics, Nursing*. 2014; 32(2): 56-63.
12. El Saghir, N. S., Keating, N. L., Carlson, R. W., Khoury, K. E., & Fallowfield, L. Tumor boards: optimizing the structure and improving efficiency of multidisciplinary management of patients with cancer worldwide. Am SocClinOncolEduc Book. 1998; 34: e461-6.
13. Jalil, R., Akhter, W., Lamb, B. W., Taylor, C., Harris, J., Green, J. S., &Sevdalis, N. Validation of team performance assessment of multidisciplinary tumor boards. *The Journal of urology*. 2014; 192(3): 891-898.
14. Alsuhaibani, R. S., Alzahrani, H., Algwaiz, G., Alfarhan, H., Alolayan, A., Abdelhafiz, N., Jazieh, A. R. Enhancing the performance of gastrointestinal tumour board by improving documentation. BMJ Open Quality. 2018; 7(1): e000168.doi:10.1136/bmjoq-2017-000168
15. Asakura, K., & Ordal, E. Is your clinical documentation improvement program compliant? Hospital finance executives, take note: your organization's clinical documentation improvement program may soon be under a microscope. *Healthcare Financial Management*. 2012; 66(10): 96-101.
16. King, E. Emerging outpatient CDI drivers and technologies [PowerPoint slides]. Retrieved from the Association of Clinical Documentation Improvement Specialists. 2013; Available: http://www.hcpro.com/acdis/ Accessed 24 June 2019.
17. GhobadianDiali, A., Toulabi, T., Gholami, M., Tarrahi, M. J., &Khademi, M. Challenges of nursing documentation in coronary care unit: a qualitative study of nurses' experiences. *The IIOAB Journal–Institute of Integrative Omics and Applied Biotechnology Journal*. 2016 ; 7(8): 134-140.
18. Asamani, J. A., Amenorpe, F. D., Babanawo, F., &Ofei, A. M. A. Nursing documentation of inpatient care in eastern Ghana. *British Journal of Nursing*. 2014; 23(1): 48-54.
19. Abid, R. I., Majeed, H. M., & Mohammed, T. R. Assessment of Nurses Documentation for Nursing Care at Surgical Wards in Baghdad Teaching Hospitals. *Journal of Pharmaceutical Sciences and Research*. 2018; 10(10): 2568-2571.
20. Baker, R. The reliability and criterion validity of a measure of patients' satisfaction with their general practice. *Family Practice*. 1999; 8(2): 171-177.
21. Buttner, P., Comfort, A., Devrick, J., Endicott, M., Kohn, D., Lo, W., Zender, A. Leading the documentation journey: A report from the AHIMA 2014 clinical documentation improvement summit. 2014; Available: http://perspectives.ahima.org/ Accessed 24 June 2019.
22. Samuels, Peter. Advice on Exploratory Factor Analysis. 2016. doi:10.13140/RG.2.1.5013.9766.
23. Reise, S. P., Waller, N. G. and Comrey, A. L. Factor analysis and scale revision. *Psychological Assessment*. 2000; 12(3): 287-297.
24. Salkind, N. J. Exploring research.(8th, Ed.). New Jersey: Pearson Education, Inc; 2011.
25. Saunders, M., Lewis, P., & Thornhill, A. Research method for business students (5th ed.). England: Pearson Education Limited; 2009.
26. Rosenblad, A. A Step-by-Step Approach to Using SAS® for Factor Analysis and Structural Equation Modelling. *International Statistical Review*. 2015; 83(2): 325-326.
27. Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. Practical considerations for using exploratory factor analysis in educational research. *Practical assessment, research & evaluation*. 2013; 18.
28. Kaiser, H. F. An index of factorial simplicity.*Psychometrika*. 1974; 39(1): 31–36. Available:http://doi.org/10.1007/BF02291575.
29. Kaiser, H. F. The varimax criterion for analytic rotation in factor analysis. Psychometrika. 1958; 23: 187-200.
30. Osborne, J. W., Costello, A. B., &Kellow, J. T. Best practices in exploratory factor analysis. *Best practices in quantitative methods*. 2008; 86-99.
31. PatilVivek H, Surendra N. Singh, Sanjay Mishra, and D. Todd Donavan. Parallel Analysis Engine to Aid in Determining Number of Factors to Retain using R [Computer software], Available:https://analytics.gonzaga.edu/parallelengine/. Accessed 24 June 2019.
32. Child, D. The Essentials of Factor Analysis. 3rd edn. New York: Continuum; 2006.
33. Field, A. Discovering Statistics using SPSS, 4th edn. London: SAGE; 2013.
34. Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson., R. E. Multivariate Data Analysis.A global perspective.(7th, Ed.). USA: Prentice Hall; 2010.
35. Keenan, A., Pituch& Stevens, J. P. Applied Multivariate Statistics for the Social Sciences. 6th edn. London: Routledge; 2016.
36. Guadagnoli, E. and Velicer, W. F. Relation of sample size to the stability of component patterns. *Psychological Bulletin*. 1988; 103(2): 265-275.
37. Cronbach, L. J. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951; 16(3): 297–334.

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