DEVELOPING A PROGRAM ON NURSING INFORMATION SYSTEM (NIS) FOR
COMPUTER GENERATED NURSING CARE PLAN IN SELECTED AREAS OF
HOSPITAL, KARNATAKA

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ABSTRACT

A methodological study to develop and test a program on Nursing Information System (NIS) for computer generated nursing care plan was carried out in the selected areas of hospitals, Karnataka.

Objectives of the study

1. To develop a program on Nursing Information System (NIS) for computer generated nursing care plan
2. To prepare a user’s manual for operating Nursing Information System (NIS)
3. To test the usability of Nursing Information System (NIS) in generating computerized nursing care plan among nurses
4. To find the association between constructs of Nursing Information System (NIS) and selected demographic characteristics of nurses

The conceptual framework of the present study was based on the theoretical frameworks of Systems Development Life Cycle (SDLC) and Orlando’s Theory of Deliberative Nursing Process.
Development of Nursing Information System (NIS)

To develop a NIS for computerized nursing care plan five phases have been adopted by the researcher. In the first phase the baseline information’s about the clients have been collected by using General Assessment Tool (GAT) as well as the researcher utilized the data from the published resources to build a nursing data base of the program for selected medical conditions incorporating the components Nursing Minimum Data Set (NMDS) and liaison has been made with the software programmer.

In the second phase the technical requirements of the proposed system have been finalized by the programmer such as Windows 2000/ Windows XP as an operating system, My Structured Query Language (MySQL) 5.0 version as data base design and Lab View 2012 as a development platform; and based on the pre set requirements master tabs have been developed with various sub tabs and all the information’s were fed and labeled separately as Master tab, transaction tab, reports tab, administration and help tab, each tab has its own unique features related to the program.

All the tabs and each component of the master tabs have been linked by MySQL 5.0 version in the third phase of NIS development. The developed NIS has been titled as “DBMS-NCP” (Data Base Management System for Nursing Care Plan). In the fourth phase researcher prepared a user’s manual for operating the NIS for generating nursing care plan with the help of programmer.

The fifth phase included usability testing of NIS with a view to determine the accuracy and reliability in generating nursing care plan through task oriented exploration among nurses. It included alpha testing - to see if all the processes appear to be functioning as specified in the flow chart of functional and design specifications using case scenarios among thirty nurses,
regression testing based on alpha testing and beta testing through entry of real time data among sixty nurses selected by purposive sampling technique.

After formal introduction the researcher demonstrated the format and functions of the system by using a LCD projector and allowed the subjects to practice with the system. After teaching and learning session each subjects were asked to develop a nursing care plan for two selected medical diagnosis by using the NIS from the researchers system and at the end, usability of NIS and its associated constructs System Usefulness, Information Quality, Interface Quality, overall usability and satisfaction towards NIS were examined through structured tool- Computer System Usability Questionnaire (CSUQ). The collected data were analyzed through an integrated system of computer program called as statistical package for social sciences (SPSS) version 20.

**Demographic characteristics of nurses**

The majority of the subjects 35(58%) were in the age group of 21-25 years and maximum number of subjects 42(70%) were females, pertaining to professional qualification equal number of subjects 30(50%) were GNM and graduate, whereas majority of the subjects 54(90%) were not undergone any technical qualification and only 06(10%) subjects completed certificate course in computer science.

The findings revealed that maximum number of subjects 42(70%) had 1-3 years of experience whereas almost equal number of subjects 30(50%), 28(47%) were working in the medical wards and medical ICU respectively. In relation to present designation majority of the subjects 55(92%) were staff nurses and only 05(8%) were working as ward in charges.

Most of the subjects 35(58%) did not have experience in use of computer and 100% reported that method of documentation was nursing notes. Pertaining to knowledge about the information system (Software) presently using as part of hospital information system majority of
the subjects 52(87%) were able to name the software correctly and majority of the subjects
54(90%) had undergone training to use the existing software.

**Usability Constructs**

The results evidenced that the maximum mean score obtained by the subjects was
5.02(71.71%) ± 0.75 in the aspect of SYSUSE\textsubscript{7} (It was easy to learn to use this system) whereas
the minimum mean score obtained by the subjects was 2.32(33.14%) ± 1.96 in the aspect of
SYSUSE\textsubscript{4} (I am able to complete my work quickly using this system). The overall mean score
obtained by the subjects in System Usefulness was 31.18 (55.68%) ± 3.21.

In relation to information quality the maximum mean score obtained by the subjects was
4.60(65.71%) ± 0.49 in the aspect of INFORQUA\textsubscript{3} (The information provided with the system is
clear) whereas the minimum mean score obtained by the subjects was 3.82(54.57%) ± 0.59 in the
aspect of INFORQUA\textsubscript{5} (The information provided with the system is easy to understand). The
overall mean information quality score obtained by the subjects was 28.73(58.63%) ± 2.72.

In the construct of interface quality, the maximum mean score obtained by the subjects
was 4.32(61.71%) ± 0.50 in the aspect of INTERQUA\textsubscript{1} (The interface of this system is pleasant)
and the minimum mean score obtained by the subjects was 3.71(53%) ± 0.69 in the aspect of
INTERQUA\textsubscript{3} (This system has all the functions and capabilities I expect it to have) whereas the
overall mean interface quality score obtained by the subjects was 11.93(56.81%) ± 1.13.

The overall mean usability score obtained by the subjects was 75.10 (56.99%) ± 5.75 and
more than 95% of the subjects expressed moderate level of satisfaction towards the NIS; hence it
was evident that the developed NIS for generating computerized nursing care plan was highly
usable among nurses.
The findings of the present study showed a significant positive correlation between system usefulness and information quality of NIS at p<0.01 (p=0.001), significant correlation between information quality and interface quality of NIS at p<0.01 (p=0.000) and significant positive correlation between interface quality and system usefulness of NIS at p<0.05 (p=0.023). There was a significant positive correlation found between overall usability and other constructs of NIS such as system usefulness (p=0.000), information quality (p=0.000), interface quality (p=0.002) at p<0.01. Hence the hypotheses stated for the present study were accepted at p<0.01 and p<0.05.

**Association between demographic characteristics and constructs of Nursing Information System (NIS)**

No significant association was found between the system usefulness, information quality, interface quality, overall usability of NIS and selected demographic characteristics of the subjects at p<0.05, but there was a significant association found between the interface quality of NIS and demographic characteristics of training undergone to use the software at p<0.05, hence the research hypothesis stated that there will be significant association between demographic characteristics and interface quality of NIS was partially accepted at p<0.05 (0.013).

The prediction of determinants of system usefulness, information quality, interface quality and overall usability of NIS was done through regression analysis. The variance caused and the predictive ability by the demographic characteristics of nurses and upon system usefulness, information quality, interface quality and overall usability of the NIS were analyzed.

The combined influence of demographic variables caused 13.8% variance (R²=0.138, F=0.734, P>0.05) and 12.8% variance (R²=0.128, F=0.785, P>0.05) among nurses and the predictive ability of demographic characteristics has explained by β regression coefficient, results revealed that demographic characteristics of nurses did not predict significantly on system
usefulness and information quality of the developed NIS, whereas gender and professional qualification had significantly predicted on interface quality at p<0.05 and overall influence of independent variables on interface quality was 36.2% (R-Square=0.362).

Conclusion

The findings from the present study strongly evidenced the usability of program on NIS in generating a computerized nursing care plan with favorable outcomes, also showed that implementing NIS in clinical practice will improve the documentation process of the nurses based on nursing process approach. The following recommendations were drawn from the present study findings for future implications.

1. Effectiveness of NIS for generating computerized nursing care plan can be assessed after integrating NIS with the existing hospital information system
2. A comparative study can be carried out to determine the time spent to develop nursing care plan by manual writing and applying nursing information system
3. The developed NIS can be tested among nursing students and nurse educators for its educational benefits
4. The nursing information system can be tested by incorporating in other branches of nursing
5. Effectiveness of NIS can be assessed in terms of functionality (combining multiple diagnosis) and quality of nursing care plan

Keywords: Nursing Information System, Computerized nursing care plan, Usability

Testing – alpha and beta testing