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MEDICAL EDUCATION FORUM

Clinical Summary and Reasoning Format: A Tool for Clinical Practice and Medical Training

Format de Résumé et de Raisonnement Clinique : Un Outil Pour la Pratique Clinique et la Formation Médicale

[2]A. N. Ikefuna, [1]*F. O. Njokanma, [3]K. E. Nkanginieme, [1]E. A. Disu

ABSTRACT

Patients' records are often bulky and unwieldy, necessitating the creation of summaries. A structured summary format adds the advantage of improved organization and easier retrieval of information. However, typical clinical summary formats do not document intermediate deductions linking symptomatology to diagnosis and to that extent fall short of tracking the cognition process of the clinician.

The Clinical Summary and Reasoning Format of the Faculties of Paediatrics of the National Postgraduate Medical College of Nigeria and the West African College of Physicians was designed to track the clinical thought and reasoning processes of clinicians. It consists of two major sections. The first section is for documenting data from history, physical examination and early laboratory reports while the second section is for recording hierarchical deductions on the way to reaching various levels of diagnosis. Definitions and descriptions of the various components of the format are herein presented. The usefulness of the format for clinical practice, clinical training and assessment of trainees is discussed. WAJM 2021; 38(9): 907–911.

Keywords: **Cognition, Clinical summary, Clinical reasoning, Format, Diagnosis.**

RÉSUMÉ

CONTEXTE: Les dossiers des patients sont souvent volumineux et peu maniables, ce qui nécessite la création de résumés. Un format de résumé structuré offre l'avantage d'une meilleure organisation et d'une récupération plus facile de l'information. Cependant, les formats de résumé clinique typiques ne documentent pas les déductions intermédiaires reliant la symptomatologie au diagnostic et, dans cette mesure, ne permettent pas de suivre le processus cognitif du clinicien. Le format de résumé clinique et de raisonnement des facultés de pédiatrie du National Postgraduate Medical College of Nigeria et du West African College of Physicians a été conçu pour suivre la pensée clinique et les processus de raisonnement des cliniciens. Il se compose de deux sections principales. La première section sert à documenter les données provenant de l'histoire, de l'examen physique et des premiers rapports de laboratoire, tandis que la seconde section sert à enregistrer les déductions hiérarchiques permettant d'atteindre les différents niveaux de diagnostic. Les définitions et les descriptions des différents composants du format sont présentées ici. L'utilité du format pour la pratique clinique, la formation clinique et l'évaluation des stagiaires est discutée. **WAJM 2021; 38(9): 907–911.**

Mots clés: Cognition, Résumé clinique, Raisonnement clinique, Format, Diagnostic.

[1]Department of Paediatrics and Child Health, Lagos State University College of Medicine, Ikeja, Lagos State, Nigeria.
[2]Department of Paediatrics, University of Nigeria College of Medicine, Ituku-Ozalla
[3]Department of Paediatrics, University of Port Harcourt, Port Harcourt, Rivers State, Nigeria.
*Correspondence: **Dr. Fidelis O. Njokanma,** Department of Paediatrics and Child Health, Lagos State University College of Medicine, Ikeja, Lagos State, Nigeria. Email: faconj@yahoo.com

INTRODUCTION

Documentation is a major imperative in doctor-patient interactions. It is useful for progressive follow-up of an index illness, for reference purposes in the event of future illness and for medico-legal reasons in the event of disputes and litigation. Thus, from the first consultation, through follow-up care to discharge, variable volumes of documentation are generated. Oftentimes, the volume is unwieldy and difficult to use, making it necessary to summarize the highlights of the interactions. Clinical summarization can be defined as the act of collecting, distilling, and synthesizing patient information for the purpose of facilitating any of a wide range of clinical tasks.[1] Examples of high-level summarization, such as the discharge summary, daily progress notes, patient handoff at change of shift, and oral case presentation, are commonplace in medicine.[1]

Various institutions and practices are adopting structured formats for summaries.[2] Structured documentation enhances reference, retrieval and analysis of information. The typical structured clinical summary format creates space for patient's identifying information, data obtained from history, physical findings, laboratory data and treatment offered but do not capture cognitive process that link symptoms and signs to diagnosis and treatment. The Faculties of Paediatrics of the National Postgraduate Medical College of Nigeria and the West African College of Physicians addressed that need in the development of a format called the Clinical Summary and Reasoning Format (CSRF) – Appendix 1. It provides a template for summary of clinical data and also for documentation of a clinical reasoning process.

Clinical reasoning has been defined in various ways. It can be seen as the cognitive process that is necessary to evaluate and manage a patient's medical problem[3] and the sum of thinking and/or decision-making processes that are used in clinical practice.[4] Thus, clinical reasoning may be seen as encompassing skills of integrating and applying of different types of knowledge, weighing evidence, critically thinking about arguments and reflecting upon the process used to arrive at a diagnosis.[5] It has been described as a core competency expected of all clinicians[6] and a major determining factor of clinical competence.[7,8]

The CSRF has sections for the clinician to document intermediate deductions made as a result of clinical reasoning beginning from symptomatology to diagnosis and management, hence its value as a tool of clinical practice.

Flowing from this, such documentation becomes a veritable training tool to guide undergraduate and postgraduate trainees through the diagnostic process. Further, a trainee's skills in the diagnostic process can be assessed by examining the quality of deductions documented on the CSRF. Thus the format is positioned to serve as a tool for clinical practice, training and verification of learning. An early version of this form was contained in a 2012 publication, albeit without elaboration.[9] It has since undergone revisions and is now presented in much more detail.

Sections of the CSRF

The CSRF may, for convenience, be divided into two parts. The first part deals with patient-derived data without any interpretation. The second part deals with conclusions from patient-derived data.

Section A:

Patient-derived Data

Patient-derived data comes from history, physical examination and laboratory investigations.

Two types of data are available from a patient's history. First, there are symptoms i.e. complaints of the patient. Symptoms are found in three sections of history viz., presenting complaints, history of presenting complaints and review of systems. Then there are those data that do not constitute complaints but are relevant to holistic evaluation of the patient i.e. other aspects of history. These are found in all other sections of history including personal demographic data.

After history, the next part of patient-derived data comes from physical examination. Signs are identified which may be indicative of a current illness or may be tell-tale features of a past disease or intervention/treatment.

The third component of patient-derived data comes from laboratory investigations. Some of the tests can be or are done by the bedside or side laboratory while more elaborate ones are done in the appropriate facilities.

Section B:

Conclusions from Patient-derived Data

Having recorded the raw data derived from the patient, the clinician will process the data into usable information. This is done in sequential steps of increasing complexity meant to encourage a forward-reasoning approach to arrive at hierarchical conclusions viz:

a. Identifying the diseased system(s),
b. Identifying the pathologic process(es) involved,
c. Distilling functional and/or structural abnormalities present,
d. Proposing a provisional diagnosis,
e. Listing required investigations,
f. Stating the pathologic diagnosis,
g. Stating the aetiologic diagnosis.

a. System(s) involved in the disease

The first level of interpretation of raw patient-derived data is to identify which of the eight systems is/are most likely involved in the disease process in order of evidence-based priority. The identified system is then exhaustively reviewed. For this purpose, the Faculties have adopted an 8-system approach:

i. Neurologic System
ii. Musculoskeletal System (subsuming the integumen)
iii. Cardiovascular System
iv. Respiratory System
v. Digestive System
vi. Genitourinary System
vii. Haematologic System
viii. Endocrine System

b. Pathologic process(es)

Having identified the diseased system(s), the next step is to work out the pathological process(es) operating in that system(s). According to the National Cancer Institute, pathologic process is a biologic function or a process having an abnormal or deleterious effect at the subcellular, cellular, multicellular or organismal level in

different ways.[10] The Faculties of Paediatrics opted to collapse the myriad of processes into nine (9), namely:

i. Inflammation,
ii. Immunologic derangement,
iii. Ischaemia,
iv. Degeneration,
v. Dysgenesis,
vi. Deranged metabolism,
vii. Lysis,
viii. Neoplasm,
ix. Trauma.

This selection is not particularly unique. In fact, it is similar to those covered in mnemonics like "VINDICATE" – Vascular, Inflammation, Neoplastic, Degeneration, Iatrogenic, Congenital, Autoimmune, Trauma and Endocrine (Metabolic).[11]

6c. Functional Abnormality and Structural Abnormality

The Faculties define a functional *abnormality as an observable* or *discernible* alteration of body function. Sometimes symptoms and signs qualify as abnormalities of function e.g. fever, cough, easy fatigability. Otherwise, a combination of symptoms and signs may point to deranged body function e.g. respiratory distress in a case where there are flaring alar nasi, intercostal and subcostal recession.

The Faculties define structural abnormalities as o*bservable* or *discernible* alteration of a tissue or organ in terms of colour, contour, content, consistency, shape or size i.e. deranged anatomy.

It should be borne in mind that structure and function are intimately related and that more than one functional or structural abnormality may be present at the same time. Therefore, abnormal structure is expected to be related to abnormality of function. For example, presence of central cyanosis *as indicated by blue buccal mucosa* (structural abnormality) bespeaks *poor oxygenation* (functional abnormality). Also, presence of post-burns *contracture* of the elbow joint (structural abnormality) is associated with *limitation of movement* across that elbow (functional abnormality).

d. Provisional d Diagnosis

A provisional diagnosis is a medical diagnosis by a professional based on the information provided at the moment considering the functional and structural abnormalities.[12] Further unravelling of the root problem will then depend on further (usually laboratory) evidence to arrive at a definitive diagnosis (pathologic and aetiologic).

7e. Investigations

In this section of the CSRF, the doctor is required to name pertinent and diagnostic tests applicable to an index patient. Considering economic, social and other factors, it is necessary to justify the costs of all aspects of healthcare.

f. Pathological Diagnosis

Interestingly, this is the stage which clinicians are most familiar with but without the prefix "pathological". Terms like meningitis, bronchopneumonia, acute glomerulonephritis, rheumatoid arthritis, neuroblastoma are all pathologic diagnoses. As is obvious from clinical practice, proposing differential

Appendix 1: Blank Clinical Summary and Reasoning Format

PATIENT'S NAME:	AGE:	DATE OF BIRTH	GENDER	DATE	ADDRESS

SYMPTOMS OBTAINED *(FROM PC, HPC & ROS)*		**ALL OTHER ASPECTS OF HISTORY**		**SIGNS ELICITED** *(POSITIVES1ST) (FROM PHYSICAL EXAM)*	
1	6	1	6	1	6
2	7	2	7	2	7
3	8	3	8	3	8
4	9	4	9	4	9
5	10	5	10	5	10

ANY BEDSIDE INVESTIGATION OR SIDELAB RESULTS OBTAINED

TEST – 1:	**RESULT – 1:**	**TEST – 2:**	**RESULT – 2:**	**TEST – 3:**	**RESULT – 3:**

System/s most likely involved in disease, in order of Evidence-Based Priority				**A**		**B**		**C**	
Review the most likely System involved-[Name:				**Review the next most likely System involved-**[Name:					
1	2	3	4	1	2	3	4		
5	6	7	8	5	6	7	8		

Pathological Process/es likely occurring in the System/s	A	B	C

Functional Abnormalities elicited from History/Physical Examination				**Structural Abnormalities elicited from History/Physical Examination**			
1	2	3	4	1	2	3	4
5	6	7	8	5	6	7	8

PROVISIONAL DIAGNOSIS/ES

IMPORTANT / DIAGNOSTIC INVESTIGATIONS INDICATED	A	B	C	D

PATHOLOGIC DIAGNOSIS / ES	**AETIOLOGIC DIAGNOSIS/ES**

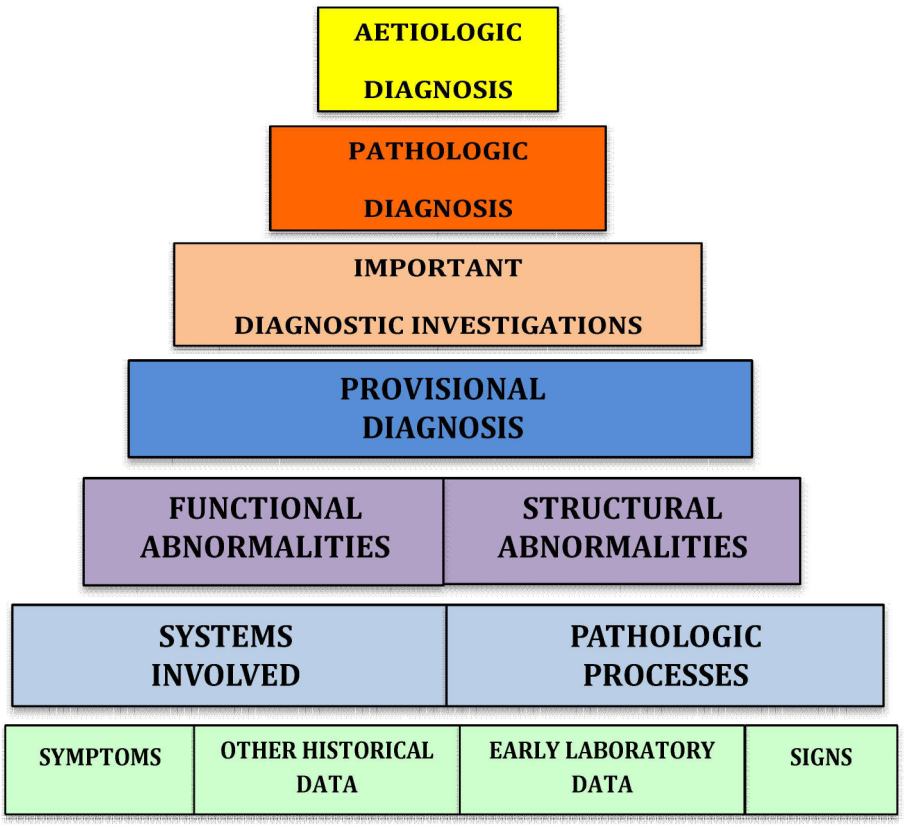
Examiner's Name & Signature:

diagnoses is inevitable here. This is principally because more than one pathologic diagnosis may share signs, symptoms and abnormalities. As a result, the plausible conclusions at this stage are speculative and will remain open to more than one diagnosis until more information (usually laboratory result) is available.

g. Aetiologic Diagnosis

It qualifies the pathologic diagnosis by naming the agent responsible for it. Aetiologic diagnosis is established by supporting clinical information with laboratory data and epidemiologic data where applicable. There are instances in which it is not feasible to name a precise aetiology. This is particularly true of non-infectious diseases like congenital abnormalities, neoplastic conditions or autoimmune disorders. It would then suffice to use an umbrella term like "idiopathic" or "unknown aetiology".

Appendix 2: Clinical Reasoning Pyramid



DISCUSSION

The CSRF satisfies the basic function of collecting and distilling clinical information. Its structured layout ensures that important sections of clinical records are addressed and in a uniform manner from one patient to another. The superiority of a structured format over an unstructured one was demonstrated by Anochie, *et al.*[13] Also, having specific fields for discharge summaries enabled Singh, *et al*[14] to analyse the quality and completeness of those summaries in a South African hospital. The authors were able for instance, to document that 91.4% of patients' outcomes, 50% of patients' weights at discharge and 67.2% of ICD–10 codes for lower respiratory tract infections were entered. Such analysis would have been very tedious without a structured format.

However, the CSRF goes beyond summarizing clinical information. It has a clinical reasoning component that shows a progressive build-up of the diagnostic process from raw data, through stage-wise levels of conclusions until an ultimate conclusion (Appendix 2). It tracks the thought processes of the user and shows how various conclusions were reached. One of the earliest proposals of tracking trend of thought was by Nkanginieme in 1997.[15] In that paper, the author pointed out that the diagnosis of a clinician can be subjected to systematic evaluation. Such systematic evaluation relies on clinical reasoning and as such, improves clinician performance and reduces cognitive errors.[6]

The process of clinical reasoning encourages the clinician to question in an iterative manner, the deductions made at each stage of the diagnostic process. Documentation in the CSRF makes it easy to assess the internal consistency among symptomatology, the system suspected to be affected by the disease, the named pathological process and the diagnosis (provisional, pathologic or aetiologic diagnosis). This attribute further distinguishes the CSRF from other forms of clinical summary that only record symptomatology, diagnosis and intervention.

Through documentation of intermediate cognition steps on the way to a diagnosis, studying a completed CSRF can potentially facilitate identification of point sources of cognition errors where they exist. Graber and Franklin[16] working in Australia, found that 74% of diagnostic errors in Internal Medicine stem from cognitive lapses mostly due to faulty synthesis of facts. It is plausible that identification of the points at which cognition lapses occur would potentially prevent diagnostic errors and also improve clinical practice.

The usefulness of the CSRF in training flows from its place in clinical practice. It has been suggested that clinical reasoning be developed early in medical training and continuously improved subsequently.[17–19] The CSRF, by virtue of demanding incremental levels of deduction, provides an opportunity for such learning. Through consistent use, an attitude of healthy enquiry and interrogation of facts is inculcated into the trainee. He/she learns to build a logical case from raw data to final decisions through a process of critical thinking and evaluation of facts.

Previous authors have pointed out that some degree of automation is

inherent to the clinician.[20,21] This translates to the experienced clinician often appearing to skip intermediate steps between presentation and diagnosis. The less experienced trainee however, finds it difficult to follow and this constitutes a barrier to learning.[22] With consistent use of the CSRF however, the trainee is able to follow the experienced clinician through the various stages of the diagnostic process.

Learning and teaching logically lead to the need for verification of learning. Modi, *et al*[6] recommend the assessment of skills of clinical reasoning throughout medical training, using both theoretical and clinical formats. This can be done using the CSRF by assessing the quality of deductions made by a trainee after contact with a live patient or a simulated patient scenario.

The CSRF is recommended for routine use by clinicians for its value in improving clinical practice through demanding critical thinking and documentation of resultant deductions. Being a relatively new tool, it is necessary for clinicians – both trainers and trainees at the undergraduate and postgraduate levels.

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Conflicts of Interest

The authors have no conflicts of interest to declare.

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