



A Modified Clinicopathological Conference as a Potential Learning Teaching Activity for Civilian and Army Medical Students and House Officers

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Authors' contributions

This work was carried out in collaboration among all authors. Author PKK designed the study, performed the literature search, wrote part of the methods and wrote the rest of the article in the first draft of the manuscript. Author MAB added few references and military aspects in the discussion. Author SCR wrote the introduction, part of methods, few references and corrected the first draft of the paper. All authors read and approved the final manuscript.

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ABSTRACT

The clinicopathological conference (CPC), a novel learning teaching activity, consciously integrates by clinical reasoning, to arrive at the final diagnosis of a selected case. This process traditionally involves case selection, presentation of the history and the clinical findings, interpretation of investigations, discussion of differential diagnoses with final diagnosis, followed by an energetic discussion of relevant aspects of the case and its management.

This article discusses a modified CPC, a potential educational activity for undergraduate medical

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students and house officers in general, with its conceptual ideas based on our pilot activity, contributing to the literature of the CPC because it highlights novel aspects of discussion used and indeed plausible, in our medical school that trains both civilian and army doctors. This academic exercise, involving preclinical and clinical specialists in a multidisciplinary environment uniquely incorporates other bodies that work together for patient care in a military hospital. The discussion embraces some views from personnel in charge of social work and administrators which could be furthered, enriching the holistic learning teaching experience of all attendees. As the learning and teaching of medicine adapts to contemporary demands, sustained efforts and commitment from organizers and participants of such a discussion contributes constructively towards the advancement of medical education. The modified CPC as presented here is an innovative platform possibly emulated for flexibility of approach, content and delivery and for its potentials in the learning and teaching of young doctors and trainees.

Keywords: Clinicopathological conference; learning teaching activity; army medical students; house officers.

1. INTRODUCTION

The clinicopathological conference, commonly known as the CPC, is an established century old academic conference with early beginnings simply in the form of an informal discussion [1]. It is a noble learning teaching activity with fundamental objectives comparable to conventional teaching, yet with a number of impressive differences of manner and purpose. Literature search is scarce on this subject from Asian countries [2,3]. Useful CPC case reports are supported by literature documentation [4].

A well-conducted CPC is a learning teaching tool for clinicopathological correlation in solving a clinical case. In the medical profession, where learning from patients is a lifelong process, the CPC provides a different framework of opportunity enhancing intellectual interaction stimulated by of a well-chosen case, with experts, for exchange of ideas with updated, evidenced based scientific information. The prime goal of the CPC is to emphasize on a systematic case discussion, commencing with its presentation, walking through its discussions by an experienced member of staff who can stimulate sustained, cogent discussion leading to a list of differential diagnoses [3]. In this way in a CPC, thinking processes are kept open and inclusive, rather than merely focusing on the end point discussions and final diagnosis.

The literature search did not reveal any published papers on the modifications in the CPC towards “holistic” patient care to the extent and manner of our discussions, which includes multidisciplinary care as well as social and

administrative issues integrated to the welfare of the patient, family and community. Hence this is a research gap that has to be filled.

The aim of this article is to present some modifications to the traditional CPC that have been conceptualized in our university. These modifications are necessarily contextual because our university educates a niche group of medical trainees comprising both future civilian and army doctors. The methods used will be stated in detail below, and includes how we chose the presentation, the activity process, how we conducted the multifaceted dialogue, presentation of final diagnosis and summary of the case.

1.1 Ethical Considerations

Since this paper does not include any study of patients there are no ethical considerations as such. However we would like to stress that the discussions do not at any time reveal the identities of patients or their families which remain unknown except to the doctors who manage the patient who adhere strictly to privacy and confidentiality of patient information. No picture slide revealing the details of the patient is ever used and if radiographs or laboratory data were used, patient identities were not disclosed either verbally or visually.

Since this activity has not been statistically tested for its effectiveness as a teaching tool, we plan to continue to conduct the modified CPC only in addition to the conventional CPCs without replacing them, until we obtain objective evidence of the effectiveness of the modified CPC.

2. METHODS OF CONDUCTING CPC

2.1 Traditional Format of CPC

There are two people directly involved in the unmodified format of the CPC. They are “the presenter” who knows the case to be presented and “the discussant” who is a neutral person without preceding knowledge of the case but who receives selected information about the case prior to the conference.

A case with potentials for discussion and with discriminating information is presented by the first speaker or “the presenter”. The conference is kick started by the presenter, well aware of the case, who presents the history, physical examination, all relevant investigations and their results. Diagnostic studies obtained are presented in the sequence of which it was ordered. The information that is provided would be sufficient to come to a diagnosis of the case hence it is not mandatory to reveal all tests and a confirmatory test may well be withheld.

Based on the information provided about the case, the second speaker or “the discussant” who is a neutral person pertaining to knowledge of the case provides evaluation of the salient clinical features with correlation of the investigation results and gives a list of differential diagnosis of the case presented. The discussant has an important role in inviting the audience participation by salient discussions, controversies, or for expert opinion. Hence, the discussant, a crucial player in the CPC, must be experienced and able to provoke a healthy discussion where all can gain from by critical thinking and clinical reasoning. Finally, the presenter will tell how the diagnosis is confirmed and provides details of the treatment given with the outcome [2].

2.2 Conducting the Modified CPC

2.2.1 Choice and presentation of the case

The chosen case is ideally of interest and with scope for all aspects of discussion. Discerning case information to allow vibrant discussion is a must such that an array of pros and cons to the differential diagnosis can be discussed. A classical presentation of unusual diagnosis or an unusual presentation of common diagnosis are cases well chosen. Cases with psychosocial problems, or those with logistics involving administrators, enhance dialogue.

2.2.2 The process

A case is presented by a final year medical student and a house officer who are referred to as first and second speakers (presenters), respectively. The person who invites the participation of the audience is the discussant, who must be an experienced academician in the primary field of the case discussed. While the first two speakers know the case well, often involved in its ward discussions, the discussant is not fully aware of it, and is told selective information about the case.

The first speaker (presenter) presents the history and physical examination emphasizing the social history and the background of the army personnel and the family (depending on the case). The second speaker (also presenter) explains investigations, their rational and results. The discussant highlights features in the clinical clerking, which in his or her opinion are important; interprets the results of investigation in relation to the clinical features; may withhold certain investigations but the case must still be solvable even without that information, with supportive differential diagnoses and thinking processes. The discussant invites the audience to participate for any other differential diagnoses, or to debate the presented diagnoses and to determine the most likely diagnosis. The final year medical student and the house officer will get opportunity of participation in the CPC and also will acquire more knowledge about the disease through the discussions.

The specialist in charge of the case (observer) knows the case well but simply observes the discussion. The specialist acts as a timekeeper and monitors the discussions, taking notes on the conference, only contributing should controversies occur.

The passive role of the specialist in charge maintains objectivity during the discussions, and allows the event to be energized by student and house officer participation. Independence in preparation and presentation encourages a trainee-driven approach with greater responsibility and ownership towards the case.

2.2.3 The multifaceted dialogue

The discussant succinctly reiterates salient features as cue to the audience, plausibly with added features, if deemed important. Important investigations are highlighted with open questions on any necessary further investigation.

Then on, focus is on a process of guiding the audience to a list of differential diagnoses with hectic consideration of pros and cons, in a simple yet systematic fashion.

Experts including those from military medicine, contribute along the course of the discussions moderated by the discussant and timed by the specialist. Diagnosis emphasizes both physical and psychosocial issues. Psychiatrists and psychologists are given a chance for valuable input, with fair weightage to time. In the modified CPC, as in its traditional form, the pathologist is central to integrative medical understanding.

2.2.4 Presentation of the final diagnosis

The presenter gives the final diagnosis with case outcome. The discussant re-invites questions, views and experiences. Management issues are critically commented upon. Experts during the interactive sessions brainstorm, a landmark activity that leaves lasting impressions in young minds. Didactic lecturing is completely disallowed and considered a setback to the progressive objectives of the interactive conference. The final diagnosis is replete with interdisciplinary psychosocial appreciation of the patient's problems, comprehended through conference discussions.

2.2.5 Summary of case

The case is summarized by the second speaker (house officer) with a complete diagnosis, agreed upon by consensus, and its core management. Problems are listed by priorities and discussed in the conference with meaningful social and administrative strategies laid out clearly.

3. DISCUSSION

3.1 Research Gap

Modifications to the traditional CPC are documented [2,3]. However, we have identified that so far from the literature review of CPCs up to 2019, using PubMed, Science Direct, Scopus and Google Scholar we did not find any paper with modifications in the CPC towards holistic patient care in the manner and extent that we have addressed. Hence we feel that there is an important research gap to be filled in this regard.

We have taken the liberty to broaden discussions of the traditional CPC to embrace many

important aspects of patient management for the advantage of both civilian and army medical students.

3.2 Differences in the Modified CPC

The modified CPC, as an educational tool for undergraduate medical students and house officers, can provide continuous medical education amongst staff. Like the traditional CPC, improving diagnostic accuracy and knowledge are an important objective but there are a number of areas that differentiate it in both style and content.

Firstly, there are three active participants and an observer as mentioned in the conducting of modified CPC.

Secondly, the discussion takes efforts to highlight the multidisciplinary nature of diseases and their management. The modified CPC emphasizes multidisciplinary integration in conventional and in unique ways. Inclusive case discussion and management issues are "holistically" addressed because it discusses physical, psychosocial and administrative issues that can affect the wellbeing of the patient, family and community integrated to some settings, such as military environments. "Many brains are better than one" aptly reflects its active interdisciplinary approach.

Integration in medical education in this university must involve facets of military medicine. Case clerking in a military hospital, predictably, demands knowledge of a practical and medical military background. Medical discussions are stimulated in distinctive areas of relevance including military staff, families and communities. Experts in military medicine come together for interdisciplinary integration, broadening its scope.

Thirdly, in the modified CPC, there is awareness of psychosocial contribution in medicine, and this is purposefully included in dialogue. Psychosocial issues span social or psychological problems, to mental disorders that potentially afflict army personnel. The psychiatrist and psychologist as important contributors, arguably define the multidisciplinary depths achieved through this modified learning teaching experience.

Health providers and an organization are important in multidisciplinary team work [5]; the person in-charge of social work and key

administrators or their representatives attend the activity. The importance of social work in medicine is recognized, and in a military hospital, their implications towards social services are opportunity for discussion and learning.

Finally, interaction with understanding amongst clinicians and administrators, palpable through mature communication in a multidimensional forum, are both educational and instructive to all.

3.3 Integration in the Modified CPC

Medicine, both an art and a science of integration, synthesizes facts [6] with clinical reasoning and horizontal and vertical integration. Integration allows overview of all subjects that young doctors use and apply at arriving to a diagnosis with good management plan. Clinical reasoning, encouraged by pioneers in medicine [7], is emphasized in a systematic and inclusive manner in the CPC. Holistic medical principles benefit the patient, family and community, carving enduring impressions in young minds. The modified CPC powers the objectives of the traditional CPC by novel and conceptualized integration.

In preparing the presented case, the medical student consciously integrates preclinical to clinical facts. The conference discusses how the diagnosis is made from logical, sequential synthesis of history and physical examination. Historical events are linked together meaningfully and by greater understanding. The physical examination, a thorough search for accurately discerned and interpreted clinical signs, may support or negate the impressions formed by the clinical history. Referred to as positive and equally important negative findings, these signs are indispensable to diagnosis [8]. An early clinical discussion occurs emphasizing clinical diagnoses, with merely supportive reliance on investigations. The first speaker, through robust preparatory groundwork, fathoms potentials of clinical reasoning, from conference inception to end.

Vertical integration links basic to more advanced knowledge, and preclinical facts are synthesized to clinical events for formulation of differential diagnoses. Horizontal integration strengthens thinking by doing away with knowledge compartmentalization [9], incorporating the basic and para-clinical sciences with clinical events for shrewd perception of a patient's problems.

Early during formulation of the differential diagnosis, thinking processes are kept open, allowing scope for discussion. Eventually focus is on the more likely differential diagnoses, or a definitive diagnosis, by interactive discussant-mediated participation through tactful prompts and inclusive dialogue.

History taking as an understanding of clinical events by integration and clinical reasoning differentiates it from a mere medical report. The history of a young child with persistent cough is integrated to the history of vaccinations such that the completion of the pertussis vaccine, for example, makes for pertussis as a less likely diagnosis of the cough [8] but does not necessarily exclude it. A child who reacted to a vaccine was not callously disqualified for future vaccination without considering reasons for this severe vaccine response. In that discussion, an underlying immune dysfunction contributed to vaccine reaction, with academic dialogue unearthing the immune deficiency. The social history of toxic exposures in a case of severe pulmonary disease, stimulated expert dialogue on cutting-edge information on vaping and e-cigarettes. The trainees, already educated on these subjects at the bedside, have such fundamentals usefully fortified.

Clinicopathological integration strengthens clinical knowledge, and through a formal academic discussion, reiterates this. With integrated comprehension, there is less reliance on rote memory. In pharmacological integration to basic sciences discussing disease pathophysiology and pharmacology for therapy, students reported enthusiasm with excellent learning experiences. An institution would require commitment, leadership skills, and early time investment for fruition of these objectives [10]; the modified CPC in our university is no exception to this. Pathological integration, with disease mechanisms, organ system pathology and application in diagnostic medicine [11] can be stressed in the conference. With methodical discussion by an expert forum, along these lines of dialogue, the trainee, who appreciates the innovative process, emulates via 'role model learning'.

3.4 Multidisciplinary Approach

The integrated welfare of the triad consisting of index patient, family and community, is central to the practice of good medicine. Hospital and health services with community support systems

sustain this healthy practice. Multidisciplinary approach shares real life experiences, and sometimes exposes practical concerns. The multidisciplinary discussion team offers practical know-how and applied understanding between doctors and paramedics and infuses this with empathy and tolerance.

A chronic illness or a communicable disease require high levels of multidisciplinary cooperation. A case of diabetes mellitus, a multisystem chronic disease, is complete only with discussions on social support systems, continued care and patient education. A case of thalassemia must involve patient and family support groups. In infectious diseases, family counselling of hygiene and safe practices, education on necessary lifestyle behaviors, on government and optional vaccines or of therapeutic prophylaxis are all matters to be discussed holistically with patient and family. Notifiable diseases require clinical and epidemiological identification with timely notification. Family involvement optimizes intervention and when parenting skills are applied to lifestyle behaviors control is effective and sustained [12]. Learning and teaching throughout the medical curriculum already emphasize this, but heeding multidimensional dialogue stresses practical implementation, reiterating these principles. Repetition is said to reinforce learning and information 'straight from the horse's mouth' makes an impression in fresh minds.

In the modified CPC, a unique area stressed involves social work. Social work is related to physical, psychosocial and behavioral health [13]; social services for the patient, family and community triad, are not ignored during discussions. The discussant, well aware of this, highlights diverse scope afforded by these services. Integration ensures knowledge of readily available services to be properly utilized without physical and financial strain.

3.5 Military Integration

Events in military service possibly influence medical care. An integrated textbook for doctors in the armed forces may not be readily available, but the modified CPC, encompassing specialists who serve the military, those who specialize in military medicine and other relevant bodies in a hospital, clinicians and academic staff, provides this essential and dynamic information.

Doctors who serve the army are dually duty bound by both the Geneva convention [14] and the Hippocrates Oath, still in custom today [15]. The army doctor, in accordance to the army culture of subordination, must 'obey' rules of the armed forces while also owning capacity to challenge ideas for scientific enquiry, in the medical profession. The idea of the modified CPC was in fact mooted to fulfill these dual demands, specifically for army doctors and for the inclusive benefit of all.

The clinical case in the modified CPC usually involves an army or ex-army personnel, or a member of the family of an army personnel, because clinical clerking is in an army hospital. Academic integration with military services commences with the clinical history. A history of specific exposures, toxins, noxious gases or environments while in service may be of relevance [16]. Clinicopathological integration associating military exposures to signs and symptoms of diseases are highlighted. In children of army personnel, the history of exposures may still be of indirect relevance. The perinatal history of a dysmorphic child whose parents serve the army may consider possible maternal exposures while pregnant, in military environments, probably linked to teratogenicity. The cause and effect of exposures with clinical manifestations may turn out to be vital grey areas yet unsearched. In one session, a child of a military officer who presented with a sternal mass of a month's duration, required not only fundamental workup but also investigation in the social history encompassing possible first or second hand military exposures, the discussions proved enlightening to all. The modified CPC is stage for related integration, scientific documentation, evidence-based investigation and state-of-art- literature reviews.

Comparable to emergency medicine, the army doctor must prepare for events not anticipated, such as natural disasters, fires, earthquakes and so on. In contingency operations, when the original plan of care becomes unviable 'out of the box' thinking is a must.

Human factors or nontechnical skills contribute to improvements in patient care. Teamwork and communication for optimal use of limited resources allowed "the facility to accept further casualties and therefore to maintain operational capability" [17]. In an emergency response, basic leadership skills, communication, negotiation, collaboration and strategic planning with people

management skills, encourages endurance for good medical leadership [18].

While all doctors must be equipped with ability to 'think on their feet' and 'out of the box', this is crucial training for army doctors. Inspiring dialogue by veterans and experts add a palpably different dimension to this event.

To optimize participation of military officers preoccupied with numerous tasks and demands, conference organizers plan contemporary innovative technology, timed telecommunication or real time video recordings. These demand executional planning, but are conceivably worthwhile in the long-term. Preliminary questionnaire and informal feedback, not yet quantitatively assessed, reveal that discussions in patient-family-community-military scenarios, can add a sense of personal and professional development amongst the attendees.

For military personnel and their families, psychological health is of importance. Psychologists or psychiatrists in discussion, offer psychosocial integration. In the Diagnostic and Statistical Manual of Mental Disorders (DSM) DSM-5, Post Traumatic Stress Disorder, (PTSD), is in a new diagnostic category of "Trauma and Stressor-related Disorders" with a common focus relating to adverse events [19]. Post traumatic emotional symptoms, conduct problems and hyperactive inattention, affected peer relationships and prosocial behaviors; these showed differences in varying age groups [20]. Learning by facilitated listening and engagement, where experts simply define a problem or integrate to patient life events; these confer expansive breadth to the modified conference.

Interdisciplinary deliberations of a military environment in context of a nation's geography, possibly linked to psychosocial illnesses, can also be interesting dialogue. Experts from public health departments and statisticians contribute. Discussions touch on socioeconomics and those with related knowledge or experience usefully quip in. Administrators, equipped with practical knowledge, complete the learning process with realizable goals.

As in general medical service, military social work, which is a specialized field, must be included when social services assist personnel, veterans, their spouses or families [21]. Post traumatic stress, psychological and emotional stressors can involve social services. In the context of military responsibilities, social services

is by the Commanding Officer of the unit and by the Malaysian Armed Forces Family Welfare or BAKAT. BAKAT dates back to the colonial era where its members, wives of military personnel, led activities to maintain military family welfare [22].

General ethical concerns of both civilian and army doctors are often worthy of discussion, however the constraints of time do not opportune the modified CPC, as an ideal forum for lengthy ethical discussions. The discussant is however cognizant that conflict and healing must be prepared for in military medical service. Despite time limitations, such issues may still be touched upon, to 'pick the brains' present during this exceptional opportunity. Short of a formal audit, questionnaires and informal feedback suggest heightened interest towards military facets by attending this niche academic dialogue.

3.6 Benefits of Discussion between Doctors and Administrators

Administrators who attend the modified CPC provide interactive education through an extraordinary framework of health care. Interdisciplinary and multidisciplinary efforts occur when various professionals gather under a single umbrella to deliberate effective and holistic care for patient, family and community. This concept is well supported, in a primary care setting, for instance, specific diseases such as chronic obstructive pulmonary disease (COPD) or palliative care benefit from multidisciplinary services [23]. There is necessity for dynamic interaction between health providers and organizational arrangements for good multidisciplinary approaches [23]. Multidisciplinary integrated care culminated in improved quality of care for the elderly in residential care facilities [24]. In pediatric oncology, advances in the basic sciences, general medicine, cooperative research protocols, and policy guidelines guided multidisciplinary approach from diagnosis to long-term survival [25]. Discussions boosting leadership skills in emergencies, such as reasoning ability in complex environments, speedy decision-making by analytic thinking; and even preparation by an army doctor to protect self while conferring quality care to save lives [26] are potential considerations.

Do young doctors need early administrative exposure? With well-timed idea exchange and suitably moderated discussion, this cooperative

effort may provide useful learning. To deliver such care, a workable liaison is necessary. Integration by multi-professional communication enhances understanding between clinicians and administrators for a win-win working environment. There would be greater confidence in dealing with administrators, if these values are cultivated early in trainees. Moreover, some doctors may choose to become future administrators, clearly benefitting from this invaluable experience.

Time is of the essence and throughout the conference, every effort is made to adhere to timing, during the individual contributions and the crisp debates. The discussant is mindful of time and the specialist in charge closely monitors it. Helpful cues on time keeping may be provided to the discussant by the specialist, in hectic discussions, whenever required. At all cost, unilateral lecturing is forbidden and nippy redirection of discussion ensures punctual and collaborative communication as its sine qua non.

4. CONCLUSIONS

Early feedback of this learning and teaching activity indicates that the students feel it promotes a greater sense of readiness and confidence in them to face challenges. Admittedly, we have to sustain this activity for a period of time for objective evidence of this to support its advantages as a widely applied educational tool.

Privileged by our unique teaching setting, we take the liberty, by the activity presented in this paper, to humbly offer new ideas that can stimulate other institutions to develop their own innovate and integrative teaching and learning activities with audit over time.

The modified CPC, as conceived here, is flexible in its approach and content, with potentials as an educational tool for further development. It is felt, from the subjective feedback that we have obtained so far, that the continued implementation of this activity in our university will provide trainees and young doctors with knowledge and confidence to face dynamic and rapidly evolving demands of their professional careers.

5. AREAS FOR FUTURE RESEARCH AND RESEARCH IMPLICATIONS

An objective questionnaire survey from the attendees (students, house officers and the

academic staff) of the modified CPC will be conducted over a period of one year (twelve sessions) to compare the positives (both the qualitative and quantitative) of the CPC without modification versus the CPC applied with the modification and the findings will be analyzed for the significance of modifications.

The results of this if positive will allow us to continue this activity instead of the conventional CPC. It will also allow other teaching institutions to flexibly innovate their CPCs towards holistic patient discussions, based on our findings.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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