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ORIGINAL ARTICLE

KNOWLEDGE, ATTITUDES, AND PRACTICES REGARDING MEDICAL CERTIFICATION OF CAUSE OF DEATH AMONG PUBLIC HEALTH MEDICAL OFFICERS IN TAMIL NADU: A CROSS-SECTIONAL STUDY

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ABSTRACT

INTRODUCTION : Accurate cause-of-death data is vital for public health surveillance, policy-making, and monitoring health trends. In India, the Civil Registration System (CRS) mandates the documentation of deaths through the Medical Certification of Cause of Death (MCCD), yet the completeness and quality of data remain suboptimal.

OBJECTIVES : To assess the knowledge, attitudes, and practices (KAP) of Medical Officers in Public Health in Tamil Nadu regarding MCCD and CRS processes.

METHODS : A cross-sectional study was conducted among 1,421 Government Medical Officers working in Primary Health Centres (PHCs), Urban PHCs, and Community Health Centres (CHCs)across Tamil Nadu. A structured questionnaire assessed demographic details, knowledge of CRS/MCCD, attitudes toward their role, and current practices.

RESULTS: Among 1,421 practitioners, 84.3% identified the CRS objective correctly, 96.5% recognized mandatory reporting of vital events, and 94.4% knew the legal framework. Knowledge gaps remained for the death registration time limit (80.6% correct) and death report forms (57.3% correct). Attitudes were favourable, with >90% agreeing on the value of CRS/MCCD and supporting formal training. Most knew correct use of Forms 4 and 4A, but 52.5% deprioritized certification under workload.

CONCLUSION: Practitioners showed strong knowledge and attitudes, but gaps in specific practices and workload-related barriers persist. Curriculum integration, refresher training, and systemic support are needed to improve data quality for public health policy.

KEYWORDS : Medical certification, Civil Registration System, KAP.

INTRODUCTION

Reliable mortality data are foundational for public health surveillance, health policy formulation, and resource allocation. The Medical Certification of Cause of Death (MCCD) is a critical component of the Civil Registration System (CRS) in India, designed to record the medical cause of death using the internationally recognized International Classification of Diseases, 10th Revision (ICD-10) developed by the World Health Organization (WHO).[1]

Despite the mandatory nature of MCCD under the Registration of Births and Deaths Act, 1969, the system suffers from underutilization and poor quality of data, especially in low- and middle-income settings.[2] In India, only a fraction of deaths is medically certified, and even among those, many certificates lack accuracy or completeness, compromising the validity of cause-of-death statistics.[3]

Tamil Nadu, known for its progressive public health infrastructure, has shown relatively better coverage of civil registration and MCCD compared to other states.[4] However, anecdotal reports and prior audits suggest persisting gaps in knowledge, documentation practices, and adherence to ICD-10 guidelines among certifying physicians, particularly at the primary care level. Understanding the **knowledge, attitudes, and practices (KAP)** of medical practitioners who are directly responsible for certifying deaths is essential for strengthening the MCCD process. This study aims to assess the KAP of government Medical Officers working in Primary Health Centres (PHCs) across Tamil Nadu and to identify key barriers and enablers that influence compliance with MCCD standards.

METHODS

Study Design and Population: A cross-sectional survey was conducted involving 1,421 government-employed Medical Officers from Primary Health Centres including Urban Primary Health Centres(UPHCs) and Community

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Health Centres(CHCs) across all districts of Tamil Nadu. The inclusion criteria required participants to be actively working in any PHC/UPHC/CHC with a minimum of 2 years experience and involved in certifying deaths. All the primary health centres including UPHC and CHC from all the districts of Tamil Nadu were included for the study. Participation was voluntary and anonymous. The doctors not working in primary health centres and the doctors working under other schemes such as RBSK, MMU were excluded from the study.

Sampling method and Sample Size: Total population sampling or census sampling was used, wherein all Medical Officers working in Primary Health Centres (PHCs), Urban Primary Health Centres (UPHCs), and Community Health Centres (CHCs) across all districts of Tamil Nadu who fulfilled the inclusion criteria were invited to participate in the study. The final sample consisted of 1,421 Medical Officers who consented to participate during the study period.

Assuming a prevalence of 50% for adequate knowledge regarding Civil Registration System and Medical Certification of Cause of Death, with a 95% confidence level and 3% absolute precision, the minimum sample size required was calculated to be 1,067. The achieved sample size of 1,421 exceeded this requirement.

Given the large sample size (n = 1,421), the study was adequately powered (>80%) to detect moderate differences in practice behaviors across qualification levels at a 5% level of significance.

A self-developed structured questionnaire was used, as no standardized tool specific to CRS and MCCD was available. The questionnaire was developed based on the Registration of Births and Deaths Act, 1969, Registrar General of India guidelines, WHO manuals, and relevant literature. The questionnaire consisted of 42 items: 18 Knowledge, 14 Attitude, and 10 Practice questions. It was administered in English.

The tool was pilot tested among Medical Officers not included in the final analysis, and minor modifications were made based on feedback. Content validity was ensured through expert review. Attitude and practice items used a 5-point Likert scale (strongly disagree to strongly agree). For analysis, "agree" and "strongly agree" responses were considered positive. Knowledge items were analyzed as correct or incorrect.

Results were analyzed domain-wise rather than as composite KAP scores. The survey questionnaire included Demographic Information such as age, gender, qualifications, work location. Knowledge Section consisted of questions on CRS objectives, time limits, legal framework, ICD-10 coding, purpose and responsibilities related to Form 4/4A. The Attitude Section consisted of questions related to perceived importance of MCCD, willingness to learn, training needs, and ethical views on accurate death certification and the Practice section consisted of questions related to training history, frequency of form completion, availability of materials, feedback mechanisms, and use of the CRS online portal.

Responses included multiple choice, Likert scales, and yes/no options. Data was captured via google forms to each participant, informing the participant the objectives of the study ensuring confidentiality. The operational definitions we used in this study are listed below,

Civil Registration System (CRS): A statutory system for the registration of births and deaths as mandated under the Registration of Births and Deaths Act, 1969.

Form 2: The official death report submitted to the Registrar under the Civil Registration System for the purpose of death registration.

Medical Certification of Cause of Death (MCCD): Certification of the cause of death by a registered medical practitioner using prescribed formats - **Form 4** for institutional deaths and **Form 4A** for non-institutional deaths.

Medical Officer: A registered medical practitioner employed in Government Primary Health Centres (PHCs), Urban Primary Health Centres (UPHCs), or Community Health Centres (CHCs) in Tamil Nadu.

Knowledge: Correct responses to questions related to CRS and MCCD, scored as 1 for correct and 0 for incorrect responses.

Attitude: Perceptions towards CRS and MCCD measured using a Likert scale; responses of "agree" or "strongly agree" were considered indicative of a positive attitude.

Practice: Self-reported behaviours related to CRS and MCCD; responses reflecting adherence to recommended practices were considered appropriate.

Workplace: Classified as rural or urban based on the geographical location of the health facility.

DATA ANALYSIS

Knowledge items were scored 1 for correct and 0 for incorrect (range: 0–18). Attitude and practice items used a 5-point Likert scale and were dichotomized for analysis: agree/strongly agree = 1, others = 0 (ranges: attitude 0–14; practice 0–10). Scores were analyzed domain-wise without creating composite KAP categories. Descriptive statistics (frequencies, percentages) were used to summarize

demographic and KAP variables. Inferential analysis including cross-tabulations explored associations between qualification level and practice behaviours. Data analysis was done using SPSS-26.

RESULTS

Participant Characteristics

A total of 1,421 government Medical Officers participated in the study. Of these, 54.3% were female (n=771) and 45.7% male (n=650). The majority were from rural postings (86.1%), while 13.9% worked in urban areas. Only 11.0% held a postgraduate qualification, while the rest were graduates.

Table 1: Knowledge, Attitudes, and Practices (KAP) of Government Medical Officers (N=1421)

Domain	Key Findings	% Correct/Positive
Knowledge	Knew CRS objective = vital statistics	84.3%
	Reported all events under CRS	96.5%
	Knew legal framework (RBD Act, 1969)	94.4%
	Knew correct time limit for death registration (21 days)	80.6%
	Correctly identified ICD-10 role	94.9%
Attitudes	CRS data useful for decision-making	91.6%
	MCCD as legal/public health duty	92.9%
	Motivated to improve skills	93.2%
	Training should be in UG & PG	89.7%
	Death certification affects healthcare perception	86.3%
	Accurate certification valuable for national policy	96.0%
Practices	Form 4 issued by treating RMP	93.8%
	Form 4A for community deaths	91.0%
	Find MCCD form easy to use	94.2%
	Likely to deprioritize under workload	52.5%

Knowledge of CRS and MCCD

Most Medical Officers (84.3%) correctly identified the primary objective of the Civil Registration System (CRS) as generating vital statistics, while 14.8% incorrectly reported hospital records as the main purpose. Nearly all respondents (96.5%) recognized that births and deaths must be mandatorily reported, and 94.4% identified the Registration of Births and Deaths Act, 1969 as the governing law.

Regarding death registration, 80.6% correctly reported the 21-day time limit, though some cited 7, 14, or 30 days. When asked about the death report form (Form 2), 57.3% selected Form 4(Cause of death form), 38.8% selected Form 2, and smaller proportions selected other options. Awareness of the purpose of MCCD was high, with 76.8% reporting "all of the above" (legal confirmation, insurance, and statistical analysis). Similarly, 94.9% recognized that ICD-10 is used to classify causes of death.

Attitudes toward CRS and MCCD

Overall, attitudes were favourable (Table 1). More than nine in ten Medical Officers considered CRS data useful for local public health decision-making (91.6%) and agreed that MCCD is an important legal and public health duty of doctors (92.9%). Motivation was high, with 93.2% willing to improve their certification skills, and 89.7% supporting inclusion of MCCD training in both undergraduate and postgraduate curricula.

Further, 86.3% agreed that certification influences community perceptions of healthcare quality, and 96.0% valued accurate certification for shaping national health policies. Regarding accountability, 68.2% favoured penalties for deliberate misreporting, while 26.2% preferred awareness-based approaches.

Practices in Death Certification

Most participants (93.8%) correctly reported that Form 4 (institutional deaths) is issued by the treating registered medical practitioner, while 91.0% identified that Form 4A is used for deaths outside institutions. A large majority (94.2%) found the current MCCD form easy to use. However, workload affected compliance: 52.5% admitted that they deprioritize MCCD documentation during high patient loads.

Table 2: Significant Associations between Demographics and Knowledge/Practices (Chi-square Tests)

Variable	Rural (%)	Urban (%)	χ^2	p-value
Correct time limit for death registration (21 days)	79.3	88.8	17.01	**0.001**
Correct death report form	56.1	63.8	4.03	**0.045**
Purpose of MCCD(Form 4, 4A)	76.5	78.9	0.87	0.832
Role of ICD-10 in certification	94.7	96.1	1.1	0.776

Associations with Demographics

Chi-square analysis revealed significant associations (Table 2). Knowledge of the time limit for death registration differed significantly between rural and urban practitioners, with urban doctors more frequently answering correctly (p=0.001). Similarly, rural practitioners were less likely to identify the correct death report form (p=0.045). Other knowledge domains (CRS objectives, legal framework, purpose of MCCD, role of ICD-10) showed no significant differences.

DISCUSSION

This study assessed the knowledge, attitudes, and practices (KAP) of government Medical Officers in Tamil Nadu regarding the Civil Registration System (CRS) and Medical Certification of Cause of Death (MCCD). The findings reveal generally high awareness of CRS objectives, legal frameworks, and death certification processes, accompanied by favourable attitudes toward the utility of these systems. However, gaps remain in certain domains of knowledge and practice, particularly in identifying the correct death reporting forms and ensuring compliance under heavy workloads.

Knowledge levels were encouraging, with most Medical Officers recognizing the importance of CRS in generating vital statistics and identifying the Registration of Births and Deaths Act, 1969, as the governing law. Similar high awareness of ICD-10 classification indicates that international coding standards are well understood.
Nonetheless, nearly one in five respondents were unaware of the correct 21-day time limit for death registration, and over 40% misidentified the correct death report form, highlighting areas where targeted training is still required. These gaps are consistent with previous studies in India and other low- and middle-income countries, which have documented variability in physician knowledge of MCCD procedures and reporting timelines[5-7]

Attitudes toward CRS and MCCD were overwhelmingly positive. The majority perceived certification as a professional responsibility and a valuable tool for health planning, in line with global evidence that accurate mortality data strengthens surveillance and policy development. [8,9] The strong motivation to improve skills and demand for inclusion of MCCD training in both undergraduate and postgraduate curricula further reinforces the need to institutionalize capacity-building in medical education, as recommended by the Registrar General of India and the World Health Organization.[10,11]

Practices reflected both strengths and weaknesses. Most doctors correctly reported the responsibility of the treating practitioner in issuing Form 4 and the use of Form 4A for community deaths. Nearly all found the MCCD form easy to use, which is reassuring. However, more than half admitted deprioritizing certification under high workload conditions. Similar barriers, including competing clinical priorities and lack of administrative support, have been reported in studies from India, Nepal, and sub-Saharan Africa.[12,13]

These findings emphasize the need for systematic training and supportive supervision to address residual gaps in MCCD implementation. Integrating MCCD modules into undergraduate and postgraduate curricula, as strongly supported by respondents, may ensure consistent competency across cadres. Refresher training and continuous medical education programs, especially targeted at rural practitioners, could bridge the observed knowledge disparities.

The tendency to deprioritize certification under workload pressure highlights structural challenges within government facilities. Simplification of procedures, digitalization of death certification, and dedicated data entry support could reduce the burden on doctors and improve compliance.[10-14] Strengthening accountability mechanisms, including clear guidelines on penalties for deliberate misreporting, may further enhance accuracy, though this should be balanced with educational approaches to avoid punitive resistance.

LIMITATIONS

This study was limited to government medical practitioners in Tamil Nadu and may not capture practices in private or tertiary institutions. Self-reported practices may also be influenced by social desirability bias. Moreover, while the study identified associations between demographics and knowledge, causal inferences cannot be drawn due to the cross-sectional design.

RECOMMENDATIONS

Based on the findings, the recommendations proposed are , Integration of MCCD training into curricula at both undergraduate and postgraduate levels, in line with global best practices, Targeted refresher training for rural practitioners, supported by district health authorities, Supportive supervision and accountability frameworks that balance education and enforcement, ensuring compliance without punitive backlash, Continuous monitoring and evaluation of CRS/MCCD data quality to inform iterative policy improvements.

CONCLUSION

Government Medical Officers in Tamil Nadu demonstrate high knowledge and favourable attitudes toward CRS and MCCD, but gaps persist in specific knowledge areas and in consistent practice under high workloads.

Addressing these challenges through curriculum reform, refresher training, and systemic support will be essential to improve the completeness and quality of mortality data, thereby strengthening public health surveillance and policy-making.

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CONFLICT OF INTEREST

None

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