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Original Article

Quality of medical records in public hospitals of Wolaita Zone, south Ethiopia, 2023: mixed study

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Abstract

Background: A Medical record is a multifunctional document that is used to communicate and document critical information about patients' medical care among health care professionals. Medical record completeness is a key performance indicator that is related to the delivery of health care services in the hospital. A medical recording system is potentially very important for the development of the health sector, particularly in Ethiopia. Ethiopia also has a poor health data status similar to other low-income countries, even within Sub-Saharan Africa. This study aims to explore the quality of medical records at public hospitals in the Wolaita zone.

Methods: An institution-based cross-sectional study concurrently with a qualitative study using a stratified sampling method was conducted from March 1-15, 2023. A purposive criterion sampling method, 19 key informant interviews (considering head of hospitals, case team coordinators, and medical record personnel from each selected hospital) method was used to collect qualitative data. A total of 406 Medical records were reviewed at three public hospitals in the Wolaita zone. The quantitative data were collected using Kobo toolkits and exported and analyzed by SPSS version 26.0. The qualitative data were collected and analyzed manually by thematic analysis.

Results: A total of 406 medical records were reviewed. In the assessment of the quality of medical records, clinical components were lowered (76%) compared to administrative components (87%). The majority of the respondents said that I "… lack of regular monitoring and evaluation process, there was a problem in the quality of medical records in the hospital". According to the expected national standard, the study also showed that the average quality of medical records of the study area was 68%. Records in tertiary hospitals were 44.5% less likely to be quality records as compared to records in primary hospitals.

Conclusion: The overall quality of medical records in Wolaita Zone was very low for components of the quality of medical records as per the standard of hospital requirements.

Keywords: Quality, medical records, hospitals, South Ethiopia, electronic medical records

Introduction

Medical record (MR) is the chronological, organized, and comprehensive documentation of services delivered by service providers to the patient/client (1). It is a means of communication among health professionals, a legal document, and a tool for medical research and training (1). It is also the primary means of evaluating the quality and appropriateness of medical care rendered, as well as a source document for statistical use in research, planning, budgeting, and financial activity involving patient care (1,2).

MR completeness is a key performance indicator that is related to the delivery of health care services in the hospital (3). Complete and accurate medical records are essential to maintain the continuity of patient care and ensure that the healthcare provider has full information about the patient when providing healthcare (3). The completeness of this medical record is a measure of the quality of care provided at the hospital (4).

MR are kept either as Paper-based Medical records (PMR) or as Electronic Medical records (EMR)(5). MR is expected to be complete and accurate to be useful as a reference in inpatient care, protection of the legal interest of the patient, physician, and the facilities, and meeting regulatory requirements for standards and research (6). The goals of recording information in medical records are to support the delivery of good care, clinical decision-making, communication between healthcare workers, continuity of care, scientific research, quality assurance, and transparency of the delivered care(7).

MR is potentially very important for the development of the health sector, particularly in Ethiopia. Ethiopia also has a poor health data status similar to other low-income countries, even within Sub-Saharan Africa(8). The country has set out different strategies to improve the quality of records to provide safe, effective, patient-centered, timely, efficient, and equitable medical service(8).

To be useful, data in a medical registry must be of good quality, meaning it should be complete, legible, reliable, accessible, and timely. Medical records are of no value to medical science or health care management if they are not accurate, reliable, and accessible. For these reasons, data utilized must be monitored for its quality (9).

Medical recording systems have faced challenges related to resources and a lack of infrastructure in the worldwide trend. Studies have indicated that medical record systems are lacking in medical record management quality in low-income countries (10).In Tanzania, over 50% of the inpatient MRS sections are considered incomplete with regard to the individual sections, attending doctor, procedures, and summary of day were the most not well completed, and the Follow-up sheet was not recorded (12).

An estimate of 27.2%-33.2% of the requests, clinical information, and unit record books were poorly managed and suffered mutilations in Nigeria(8-12). In the rural part of hospitals in Ethiopia, only 45.7% of MRS was complete(13). An improvement in MRS completeness from baseline 0%-73.6% post-intervention assessment shows in inpatient of Dalefade Primary Hospital West Afar, Ethiopia around 73% of inpatient MRS complete in baseline assessment in Menelik II referral hospital which is low against the standard expected to be 100% and also there are knowledge gaps and shortage of MR formats were observed as a root cause for the existence of incomplete inpatient MRS(14). Despite the importance of MRS to high-quality and efficient care management of patients, MRS, especially in developing countries like Ethiopia, does not fulfill the basic purposes of the MR system, generally inadequately supported and poorly

managed. The MRS is incomplete, has lots of misses, and the handling and tracking mechanism of medical records is also ineffective when the patient comes for follow-up and other medical or surgical services. He/she is compelled to incur additional cost, and besides, the physician wastes more time in diagnosing and unnecessarily ordering laboratory tests (14, 15).

MR studies have shown that (14%) of returning patients could locate their medical records, and only (6.5%) of medical records contained complete patient information due to problems such as duplication, incompleteness, and inaccuracy of clinical information in Ethiopia (17). Incomplete, missing sheets, illegible handwriting, and the use of confusing abbreviations were major drawbacks of paper-based medical records. Some of these have been reported as common sources of weakness in a surgeon's defense in medico-legal (18). Ethiopia, including the study area, has been implementing HMIS at all levels of the health system and standardized indicators, data collection and reporting forms, and procedures (7,19). Several studies were conducted on the documentation of MRS in other countries (20), whereas in Ethiopia, few studies were conducted, even though it is not directly related to the assessment of the quality of MRS (5).

Therefore, this study aims to explore the quality of medical records at public hospitals in the Wolaita zone. Exploring medical records at public hospitals helps to show their status in the quality of MR management, and shares best practices among the hospitals.

Methods and materials

Study Area

The study was conducted in Wolaita Zone, south Ethiopia. Wolaita zone is located at a distance of 126km from the Sidama region capital town, Hawassa, via Dimtu town and 330Km South of the capital city (Addis Ababa). Wolaita Zone is administratively divided into twelve districts and three town administrations. The Zone has 6 primary hospitals: 2(private), 2(NGOs), 1 comprehensive tertiary hospital, 71 health centers, 372 health posts, and 98 private clinics. Based on the projection of the 2007 population and housing census, the population of Wolaita Zone is about 1888,390 in 2014, out of which 50.73% is female and 49.27% is male, and 96.31% are Wolaita ethnic groups.

Study Design and Period

An institution-based cross-sectional study, supplemented by a qualitative method, was concurrently conducted.

Source and Study population

All medical records of patients of the public hospital in the Wolaita Zone are the source population. The study population was all medical records from those produced during the data collection period in a selected pubic hospital in the Wolaita zone. For the qualitative data study population was all hospital medical directors, case team coordinators, and medical records personnel at the selected public hospital of Wolaita zone.

Eligibility criteria

A medical record of those patients attending the selected hospitals in the last year was included. Professionals who were not in hospitals for one year were not included, as key informants were excluded.

Sample Size Determination

The sample size for the quantitative study was calculated by using a single population proportion formula based on the following assumptions. The proportion of medical records having quality was estimated to be 40 % (institution-based - based cross-sectional studies from a previous study conducted in Hadiya Zone, Soro district, which gives the maximum sample size (15).

n (z α/2)2 p (1-p)/d2

Where, n =sample size.

d 2 = marginal error.

Z (α/2) at CI of 95% i.e.1.96.

By considering a 95% level of confidence and 5% margin of error, the minimum required sample size was found to be 406 medical records.

The sample size for the qualitative study was determined purposively, considering heads of hospitals, case team coordinators, and medical record personnel from each selected hospital (until saturation of ideas).

Sampling Procedures

Public hospitals were stratified into tertiary hospitals and primary hospitals. There are no General hospitals in the Woliata zone. Then, study hospitals were selected randomly from each stratum. Next, using a proportional to size allocation method, the required sample size was taken from each of the selected hospitals, and the observation unit (MR charts) was selected from each hospital using a systematic random sampling technique. The total medical records were 20200, of these WSUSCH (15000), Tebela primary hospital (3200), and Boditi primary hospital (3200). The total sample size was 406 medical records of these WSUSCH (301), Tebela primary hospital (64), and Boditi primary hospital (41). The first card was selected using a lottery method from 25 medical records selected from the registration book, then the interval between the cards was every 25 cards until the required sample size was collected. In addition, 19 key informants (3 hospital heads and 16MR personnel and Case team coordinators) were selected considering their experiences in the selected hospitals, and year of delegation for responsibility at hospitals, to support the reviewed data and to assess the dimensions of medical records quality. (Table 1)

Table 1: Proportional allocation of sample size

Name hospital	N= Total Outpatient Per Capita for three hospitals	Ni=Outpatient Per Capita for One Month	Total Sample Size	(Ni*N)/N =Proportional Allocation to Each Hospital
WSUSCH	20200	15,000	n=406	301
Tebela Primary Hospital		3200		64
Boditi Primary Hospital		2000		41

Operational Definitions

- **Medical Record**: is a written medical document of a patient or client by an authorized service provider of a health institution.
- **Completeness of medical record**- The medical record shall contain sufficient information to identify and assess the patient and furnish evidence on the course of the patient's health/medical care.
- **Administrative data**: includes patients' medical identification/demographic data.
- **Timeliness** is measured by the WHO's receiving facilities' reports by the predetermined deadlines.
- **Good quality MR**: the medical record is labeled as having good quality if greater than or equal to eighty percent (≥80%) of

the major components are completed properly; otherwise, poor quality (19).

- **% of completed quality medical record** = Total Score (yes`s) / (Number of cards checked for quality × number of contents) (Taken from: Federal hospital performance monitoring and improvement manual and EHAQ (20)).
- **Qualified Medical Record Personnel**: an employee who is a full-time custodian/medical record personnel (Health Information Technician) member with basic computer skills and the ability to organize medical records, responsible for medical records management.
- **Adequate Human resources** –five or above MR staff with at least an educational status of grade 10 or higher and computer skills.
- **Inadequate Human resources** – four or fewer MR staff and have educational status of less than grade 10 completed, and didn't have computer skills.

Data collection tools and procedures

Data was collected through data gathering tools (key informant interview guide) from literature review and experts for qualitative and document review (checklists) for quantitative, which was prepared based on the standard for Ethiopian hospitals' requirements (16–18). For quantitative data medical records of patients were reviewed by using a checklist from folders. The questionnaire and checklist were developed by reviewing relevant literature (15) and standard guidelines (4,19).

Qualitative data

An in-depth interview and interview checklist were used. A semi-structured open interview guide with a flexible probing technique was used. It was initially developed in English, translated into Amharic (the local and national language), and back-translated into English to ensure consistency. Participants were encouraged to speak and express their ideas freely and describe their experiences with cases related to the topic. All interviews were conducted by the author in Amharic, tape-recorded, translated, and transcribed verbatim on the same day of the interview. Interviews of participants continued until saturation was reached, meaning the investigator agreed that there would be redundancy in the responses and there would be no new ideas emerging.

Data Quality Control

The tools were developed first in English; some checklists are interviewer-administered questionnaires that do not need translation. Before collecting data and in order to perform a quality control on the checklists, Data collectors were supervised by a supervisor and the principal investigator. Data collectors submitted data, and it was checked for missing values and consistencies by the principal investigator. Two supervisors were recruited to supervise the data collectors and perform facility inventory at their respective facilities.

For qualitative, the tools were developed first in English and were translated into the local language (Amharic) and triangulated with tape recording and observation.

Data entry and Analysis

Quantitative part: The data were collected and cleaned by the Kobo toolkit and also exported and analyzed using SPSS version 26.0. Descriptive statistics were carried out, and results were presented using proportions, percentages, and means. The average of the contents of the medical record was taken to determine the overall quality of the medical record. To determine statistical significance, 95% confidence intervals were computed, along with the associated p-value ($p < 0.05$) for comparison.

Qualitative part: predetermined theme (Input attribute of quality, Process attribute of quality, and Output attribute of quality of questionnaires was used and analyzed by thematic analysis to analyze qualitative data. Text by text, every interview was thoroughly read, and codes were predetermined.

Results

General Description

Four hundred six medical records were reviewed from three public hospitals of Wolaita zone, with a retrieval rate of 100%. Of these, 301(74%) medical records were from WSUSCH, 41(10%) from BPH, 15% from TPH. In addition, 3 hospital heads and 16 case team coordinators from respective hospitals participated to support the reviewed data and to show the attributes for quality medical record production.

Socio-demographic characteristics of key informants

Besides document review, sixteen case team coordinators of hospitals, medical record personnel, and three heads participated as key informants to triangulate the reviewed data and to mention the dimensions for medical record quality in hospitals. The majority of them, 15 (73.7%), were males, and 11(57.9%) of participants were diploma holders by qualification. The median age of them is 32.5, and the standard deviation of 5.037. The maximum work experiences of them are 5 years, and the minimum is 1 year (Table 2).

Table 2: Characteristics of key informants, Wolaita zone public hospital, Southern Ethiopia, 2023.

Variables		Frequency	Percent
Sex	Male	15	73.7
	Female	4	22.3
Age	20-33	10	52.6
	33-45	9	47.4
Educational status	Diploma	11	57.9
	First degree	8	42.1
Service year	1-4	15	78.9
	4-7	4	21.1

Components of medical records

Four hundred six medical records were reviewed during the data collection period in three public hospitals in Wolaita zone. All components for the completeness of medical records were checked for the quality of medical records with respect to administrative, clinical, financial, and legal contents.

Documentation of administrative data contents

Data of patient's identification or demographic data were reviewed in each of medical records of hospital. The highest value of documentation belonged to the title and name of the hospital (100%). In 77(18.9%) of medical records, the date of birth of patients was recorded, and 94.3% of them had the sex of patients. The lowest recorded value in the documentation was marital/citizenship (31.5%), (Table 3).

Documentation of clinical data contents

Clinical components of medical records include medical and therapeutic information of the patients. The contents of this section are important from a medical point of view. Among the clinical data contents, 308(75.9%) were clinical data components recording the presenting problem/complaints, 316(77.8%) had records of current diagnosis information, and 276(66%) had medication and diet information. Only 97(23.9%) recorded information about service users concerning alerts /allergies (Table 4).

Table 3: Recorded components of administrative data of medical records of patients of Wolaita zone public hospital, Southern Ethiopia, 2023.

	WSUSCH frequency	%	Tebela PH frequency	%	Boditi BP frequency	%
Title and name of health center recorded	301	100	64	100	41	100
Full name of patient recorded	300	99.7	64	100	41	100
Date of birth recorded	60	19.9	6	9.4	11	26.6
Home address recorded	287	95.3	59	92.2	38	92.7
Sex of patient recorded	286	95	59	92.2	38	92.7
Health care record number assigned at registration	294	97.7	59	92.2	40	97.3
Mode of arrival (reason to come to the Hospital)	245	81.7	42	65.6	31	75.8

Table 4: Recorded components of clinical data of medical records of patients, Wolaita zone public hospital, Southern Ethiopia, 2023.

Variables	WSUSCH Freq	%	Tebela PH Freq	%	Boditi PH Freq	%
History and physical examination forms	265	88	52	81.3	38	92.7
Presenting problem/complaint	224	74.4	49	76.6	35	85.4
Past illnesses	117	38.9	39	60.9	25	61
Current diagnoses	228	75.7	50	78.1	38	92.7
Service user alerts/allergies	72	23.8	15	23.4	10	24.4
Procedures and investigations	173	57.5	43	67.3	31	75.6
Medications and diets	201	66.8	47	73.4	28	68.3
Family history	126	41.9	24	37.5	20	49.8
Examination findings	208	69.1	46	71.6	31	75.6
Results of investigations	242	80.4	50	79.1	36	87.8
Overall assessment	276	91.7	60	93.8	40	97.6
Management plan	277	92	60	93.8	40	97.6
Information given to the service user	102	33.9	20	31.3	17	41.5
Follow-up entry	108	35.9	29	45.3	23	56.1

Documentation of financial and legal data contents

Concerning financial and legal data in medical records, 176(43.3%) of medical records of patients had information about the service fee, and 238(56.6%) had also information about the accomplishment of the medication fee. Medical records consent for retrieval and consent for treatments were the least recorded in all hospitals (Table 5).

Assessment of quality medical records in terms of completeness

Accordingly, to assess the quality of medical records with respect to each major section of components, the identified necessary contents of section was calculated as follows: total contents fulfilled in each section of the study (Yes's) divided by total revised medical records multiplied by number of factors in each section (the number of contents/variables in each of the

Section). It is reported as % completeness of the medical record (16–18).

Administrative data content: total contents/total revised documents*7 = 2495/406*7= 2495/2842=87%
Clinical data contents = total contents/total revised documents*14 = 4320/406*14 = 4320/5684=76%
Financial and legal contents = total contents/total revised documents* 6 = 1006/406*6 =1006/2436 = 41%
Average mean of all components of the quality of the medical record in percentage Admin + Clinical + legal and financial/ 3 = 87+76+41/3 = 68% (Figure 1).

Table 5: Recorded components of legal and financial data of medical records of patients, Wolaita zone public hospital, Southern Ethiopia, 2023.

Variables	WSUSCH		Tebela PH		Boditi PH	
	Freq	%	Freq	%	Freq	%
Consent for treatment	97	32.2	21	32.8	24	58.5
Consent for information retrieval	52	17.3	18	28.1	16	39
Authenticated by the responsible service provider	96	31.9	19	29.7	20	48.8
Service fee	131	43.5	27	42.3	18	43.8
Medication fee	179	59.5	42	65.6	17	41.5
Investigation fee	171	56.8	41	64.1	17	41.5

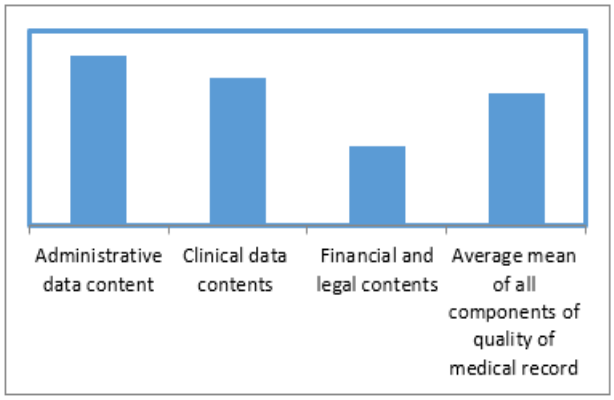

Figure 1: Quality of medical records with respect to each component, Wolaita zone public hospital, Southern Ethiopia, 2023

View of the key informants about the reviewed medical records quality and dimensions of quality of medical records (completeness).

In line with the medical record review, the key informants also have the view that there is a problem with the quality of the MRs. The majority of case team coordinators from the key informants, 16 out of 19 (84%), agreed that there is poor data accessibility and retrievability due to the poor unique patient numbering system. The same number (84%) replied that professionals failed to write the date of visit on all components of the chart. All of the respondents mentioned that the family history, past history, and functional inquiry (including significant negative observations) are not clearly recorded and maintained in the medical record.

Ten (52.6%) of the coordinators said that allergies were not clearly documented in their respective hospitals. All of the respondents (100%) commonly agreed that the chief complaint of the patient was clearly stated in the medical record. According to the respondents (78.9%), scientifically known abbreviations and duration of symptoms were clearly written on medical records. Similarly, respondents mentioned hospitals have problems with the laboratory and investigation documentation system in the medical records of the patients. In contrast, 17(89.5%) of respondents mentioned service providers did not authenticate medical records during service provision.

One Nurse from the emergency OPD department (28 years old, Male) expresses his feelings as follows: "…. most of the cards were felt by negligence because one health professional is responsible for seeing more than 30 cards in the morning…" . In contrast… one physician from the OPD department (34 years old, female) expresses her feeling as follows: "…we don't have a problem in case of filling medical records; however, there was a problem for getting information from the paper, and some modifications should be made…"

Assessment of dimensions of quality of medical records

In the present study, 10 (52%) of the study case team coordinators mentioned the presence of gaps in medical record entries (dating, and signing by a responsible professional). In addition, there was no monitoring, evaluation, and supervision carried out in the medical record department by the responsible bodies. Moreover, according to respondents, 15 (78%) medical record forms were not held by a clip or fastener, and none of the hospitals' auditing of MR documents as of the standard.

Space for medical record quality

About 5(27%) respondents noted that there is no specific storeroom for medical records and separated areas for filing active and inactive medical records in the hospital's premises (Table 6)

Supplies for medical records quality

All lists of standardized printed formats were also evaluated in the medical records of patients in each hospital. Two hundred twenty-four (55%) medical records had no standardized investigation chart. Fifty-one (13%) of them had no history and physical examination format or chart. Two hundred sixty-four (65%) of records had no treatment charts. Relatively, WSUSCH medical records had the necessary formats of medical records than other hospitals.

Table 6: Space for quality of medical records, Wolaita zone public hospital, Southern Ethiopia, 2023

Variables	Response	Freq	%
MRD space to handle all functions properly	No	4	27
	Yes	15	73
The design facilitates handling the traffic of people, records, and equipment inside the MRD.	No	4	27
	Yes	15	73
Separately provided active and inactive MR filing areas	No	4	27
	Yes	15	73
A storeroom for MRD	No	4	27
	Yes	15	73

In addition to interviewees' responses, the three hospitals were checked for the availability of necessary basic supplies, which are important for recording, processing, documenting, filing, and retaining medical records safely and in a secure manner. According to the national hospital's supplies requirement, the majority of supplies were not adequate to run the basic medical recording system. Only WSUSCH had the investigation request format and the medication prescription format (Table 7).

In addition to this, most of the participants of the in-depth interview said that explained absence of computers because of the lack of a budget, which hinders them from having a computerized system that improves the quality of medical records.

None of the card rooms has a lock. Sometimes there is a loss of medical records of the patient's medico-legal records, because of not handled properly and the room is not locked.

Table 7: Availability of necessary formats in medical records of patients, Wolaita zone public hospital, Southern Ethiopia, 2023

List of formats	WSUSCH(n=301)		Tebela PH(n=64)		Boditi PH (n=41)		Total (n=406)	
	Freq	%	Freq	%	Freq	%	Freq	%
Front/factsheet available	284	94	60	93	37	90	381	93
History and examination chart available	265	88	52	81	38	92	355	87
Investigation chart available	139	46	53	36	20	48	183	45
Treatment chart available	104	34	20	31	18	44	142	35

Table 8: Capacity building assessment for quality of medical records of Wolaita zone public hospital, Southern Ethiopia, 2023

Variables	Response	Freq (n= 19)	Percent
Enough number of MRD personnel	No	13	68
	Yes	6	32
Formal training for the MRD director and technicians in MR	No	16	84
	Yes	3	16
Qualified and competent employee in the hospital	No	7	36
	Yes	12	64
Provision of on-the-job training to employees frequently	No	4	21
	Yes	15	79
Provision of induction and orientation for new employees in the MRD	No	5	26
	Yes	14	74
Merit-based employee placement	No	15	79
	Yes	4	21

35-year-old female record personnel with 2 years of experience expresses her feeling as follows-" …. We ask for reports many times about the Shortage of shelves, Lack of functional computers and the recording system is not an online computer-based system, they said, due to the shortage of budgets." 30-year-old male record personnel with 2 years of experience said that "…. We face repeatedly similar problems such as loss of recorded history, their individual medical folder, and service identification cards."

Human resource requirement

Capacity building

Thirteen (68%) respondents mentioned that the shortage of employees related to the medical records in the hospitals. Fifteen (79%) of the respondents answered that the lack Merit merit-based employee placement is another gap to keep quality MR (Table 8**)**

32-year-old male record personnel with 3 years of experience "…. In our office, most of our colleagues are untrained, and we ask for training and assignment of skilled personnel. The higher health department answered that we have a lack of budget." All participants of the in-depth interview mentioned that most of the time they face difficulty to found the folder in a short time easily due to different reasons like the patient lost (forget) the services cards, wash the service card with their clothes when the patient cannot place service card safely, and the medical

records not returned daily to the medical record unit from service area.

22-year-old Female record personnel with years of experience said that "…In our office, most of our staff are untrained, and we ask for training and assignment of skilled personnel. The higher health department answered that we lack of budget."

36-year-old male medical record room head, who has 3 years of work experience, said that
"…. I remember that many days individual medical record of a chronic patient was lost from shelve then replaced by other medical records".
The overall completeness of the reviewed medical records of the hospitals is 68% (Table 9).

Table 9: Overall quality of medical records of each hospital in the Wolaita zone, southern Ethiopia, 2023

Variables	WSU SCH (%)	Tebela PH (%)	Boditi PH (%)	Total (%)
Administrative content	84	78	69	77
Clinical content	62	65	73	67
Financial and legal content	40	43	44	42

Records at primary hospitals were 44.5% less likely to be quality records as compared to records in the above tertiary hospitals (95% CI: 41.8–67.9%), $p < 0.001$(Table 10).

Table 10: Cross-tabulation of facility type and quality of medical record

	Facility type		Total
	Tertiary hospitals	Primary hospitals	
Poor records	62%(187)	60%(63)	61% (250)
Quality records	38%(114)	40%(42)	39%(156)
Total	100(301)	100%(105)	100%(406)

Qualitative results

Thematic analysis

19 participants were interviewed using face-to-face in-depth interviews. During an interview, the responses were recorded, and the interviewers took notes. The responses are summarized in 3 predetermined themes. The 3 themes were further divided into 7sub sub-sub-themes sections (Table 11)

Table 11: Thematic analysis

Themes	Categories/subthemes
Input attribute of quality	Human resources related
	Medical record room input resource-related
	Chart fulfillment
Process attribute of quality	Client awareness
	Medical room-related
Output attribute of quality	Medical record personnel related
	Client related

Theme 1: Input attribute of quality

Subtheme 1: Human resources-related factors

All participants of the qualitative part responded that to improve the quality of medical records, trained recording personnel must be assigned in the record room, necessary materials need to be fulfilled as per the standard, need to construct standard medical record unit, the patient records need to be placed in a safe place, and necessary information should be completed in every patient's records.

"In our office, most of our colleagues are untrained, and we ask for training and assignment of skilled personnel. The higher health department answered that we have a lack of budget", 32-year-old male record personnel with 3 years of experience.

Subtheme 2: Medical record room input resource related

None of the card rooms has a lock. Sometimes there is a loss of medical records of the patient's medico-legal records, because of not handled properly and the room is not locked. " We ask for a report many times about the Shortage of shelves, the Lack of a functional computer, and the recording system is not an online computer-based system, they said, due to the shortage of budgets, 35-year-old female record personnel with 2 years of experience.

Subtheme 3: Chart fulfillment

Additionally, they stressed the absence of MPI cards, ANC charts, and tracer cards. "We face repeatedly similar problems such as loss of recorded history, their individual medical folder, and service identification cards," 30-year-old male record personnel with 2 years of experience.

"We ask the head of the hospital to purchase the MPI cards, but still, the cards are not printed," 25-year-old male record personnel with 2 years of experience.

Theme 2: Process attribute of quality

Subtheme 1: Client awareness

A folder is assigned to each individual medical record of the clients.
"Most of the time, we face the difficulty of getting individual medical records from the shelves. The clients lost their service identification card while coming for another visit. Due to this, they may stay a long time, and they complain", 40-year-old male record personnel with 2 years of experience.

Subtheme 2: Medical room related

In addition to the findings from the quantitative study, respondents of in-depth interviews explained problems regarding medical record keeping, high patient loads, and patients' poor knowledge and awareness of proper handling of service identification cards.

"Most of the time, we face the difficulty of getting individual medical records from the shelves. The clients lost their service identification card while coming for another visit. Due to this, they may stay a long time, and they complain", 35-year-old male record personnel with 5 years of experience.

There is no established medical record auditing system as per facilities standards. But some of the facilities conduct auditing with the insurance scheme team while they work on clinical auditing for payment every quarter, but as such not continuous.

"As standard, all facilities need to use tracer cards. But we are not using tracer cards due to a lack of the card; instead that we are using the information on the summary sheet, 32-year-old female record personnel with three years' experience.

"We have tried to audit those records that have stayed more than five years in the medical record unit, but all records have been audited because of many medical records stored in the medical record unit for a long period that are not audited regularly.", 35 years old male with fifteen years' experience.

Theme 3: Outcome attributes of quality

Subtheme 1: Medical record personnel related

All participants of the in-depth interview mentioned that most of the time they face difficulty to found the folder in a short time easily due to different reasons like the patient lost (forget) the services cards, wash the service card with their clothes when the patient cannot place service card safely, and the medical

records not returned daily to the medical record unit from service area.

"I remember that many days individual medical record of a chronic patient was lost from shelve then replaced by other medical records", 36-year-old male record personnel who has 3 years of work experience.

Subtheme 2: Client-related

Additionally, respondents also mentioned the absence of tracer cards because of the poor implementation of the standard procedure for MRU.
"Everybody is responsible for the proper handling of an individual medical record, for example, those card room workers need to handle and place properly, the health worker must record the necessary information completely and accurately, and also the administrative body of the health center must fulfill the different formats and materials timely manner", 32-year-old male who has three years of work experience.

Discussion

This study was conducted with the objective of assessing medical records data quality in the Wolaita zone. Key findings show that there are notable gaps in completeness and legibility of patient profile, complaint, diagnosis, treatment and date, and signature. As a written collection of information about a patient's health and treatment, medical records are used essentially for the present and continuing care of the patient.

In this study, 406 medical records were reviewed to assess quality and to identify dimensions of medical records for quality; 68% of components of the quality medical records were completed based on the standard of hospital medical record requirements. Similarly, a study conducted in a rural hospital in Ethiopia showed that 45.7% of medical records were completed (11). Inconsistency with a study of Minilik II Referral Hospital, the completeness of the medical record was 73% (5). Another study conducted at Hadiya zone, Soro district, was 40.2% (15). This might be due to differences in the study area and methodology. On the completeness of medical records, though most of the administrative data were recorded, the date of birth and the mode of arrival were the least recorded elements, with 19% and 21%, respectively. This finding was lower compared with the studies done in Emam Reza hospital and Valais hospital in Iran, which indicated a 61.7% recording of date of birth and mode of arrival (12). This might be due to weak monitoring and follow-up by the medical record department, as evidenced by the qualitative data. On the other hand, the completeness of the medical records for the presenting complaint was recorded at 80%, which is higher than a study conducted in South Africa, in which the history of the present complaint was recorded at 65% (14). This might be due to the difference in study units, in which the latter one focused only on a single ward, while this study was conducted in all service departments associated with the facilities.

In the present study, it is clear that the result shows all medical records were incomplete in these hospitals. However, medical records have a significant benefit for high-quality and efficient care management of patients. In many hospitals set up of developing countries, including Ethiopia, medical records have not been a priority, generally inadequately supported and poorly managed. To alleviate the quality problem related to medical records, studies have indicated the presence of interventions to improve the completeness of medical records (11, 21).

Completeness of the medical records for medication and diet were recorded (69%), in (20%) of the records past medical history were recorded, in (44%) of the records service user allergies were recorded, in (39%) of the records were follow up entry recorded and in 41% of the

records family history were recorded in the patient medical records. This is not consistent with a study conducted in Nigeria indicates that medications and diets were recorded in (82.6%), (87.7%) of records contained information on past medical history, past family history illnesses were recorded in (31.8%), and follow-up entry was 93.62% (12).

Whereas the study conducted in South Africa also varies from the present study; previous medical history (76%), service user allergies (59%) (14). The variation might be due to a lack of training, poor follow-up of the completion process, lack of commitment, and poor understanding of the standard. This study reveals that 77% of the medical records current diagnosis were recorded, 78% of the records management plan were recorded, 60% of records procedure and investigation were recorded, 92% of the records overall assessment were recorded, 70% of the records examination findings were recorded, around 80% of the records were result of investigation recorded and 21% of the records information given to service user were recorded. This is inconsistent with a study conducted in Iran that indicates the medical history and physical examination completed was 71%, 100% laboratory report attachment, and radiological exam 53% (22). This might be due to differences in the study area and sample size. Findings from the component of legal and financial data revealed that 13% were investigation fees recorded, 5% were service fees recorded, and 2% were medication fees recorded in the medical records.

Almost all reviewed medical records consent for treatment, consent for information retrieval, and authentication were the least recorded content in the studied facilities. This was different as per the standard stated “entries in the patient's medical record should be dated and signed by the custodian/recording person” (16–18). This is probably due to the weak control of the financing system and the negligence of the workers.

The overall completeness of the reviewed medical records of the hospitals is 68% for components of the quality of medical records completed based on the standard of health facilities requirements. Similarly, a study conducted in a rural hospital of Ethiopia indicated that 45.7% of medical records were completed (11). Inconsistency with a study of Minilik II Referral Hospital, the completeness of the medical record was 73% (5). This might be due to differences in the study area and methodology.

Records at primary hospitals were 44.5% less likely to be quality records as compared to records in tertiary hospitals (95% CI: 41.8–67.9%), $p < 0.001$. A study from the same country also reported that general hospitals are more likely to report good data as compared to primary hospitals and health centers (23). This could be due to the setup of facilities. General and above Hospitals are more equipped and staffed than the primary hospital. Despite the computer revolution and data digitalization, clinical records, especially in a study setting, continue to be handwritten and difficult to read.

In this study, most of the hospitals were not implementing auditing of the MR document. The majority of the respondents said that I “… Since the lack of regular monitoring and evaluation process, there was a problem in the quality of medical records in the hospitals…” According to the study conducted in eastern Ethiopia, the presence of auditing, evaluation, and monitoring is needed to improve data quality improvement changes with the supervisory directives and feedback role (15,24). Similarly, a study conducted in Rwanda (10) showed the importance of proper medical record management in facilitating high-quality care in health institutions. It has also contributed to accreditation efforts and medical record auditing to prove the implementation of a policy or guideline.

All participants of the qualitative part responded that to improve the quality of medical records, trained recording personnel must be assigned in the record room, necessary materials need to be fulfilled as per the standard, need to construct standard medical record unit, the patient records need to be placed in a safe place, and necessary information should be completed in every patient's records. Most of the respondents said that "In our office, most of our colleagues are untrained, and we ask for training and assignment of skilled personnel. The higher health department answered that we have a lack of budget."

Although I reviewed the quality of medical records for completeness and legibility in multiple sites, limitations of this study include that other dimensions of medical records quality, like security (confidentiality) and inpatient chart fulfillment, were not addressed. Finally, I used a structured checklist with options described in results, and data were categorized during data collection at field levels; detailed information on some of the items was missing. For example, which of the demographic data (name, sex, age, and/or address) was missing was not addressed.

Conclusion

The findings of the study concluded that the quality of medical records in public hospitals in the Wolaita zone is poor as per the standard of hospital requirements. The available human resources in the MRU are unqualified, untrained, and not in sufficient numbers to run the medical records of the patients in the majority of the studied health facilities. The MRUs are not standardized, and there is a shortage of recording formats and equipment. Therefore, based on the findings of the study, the following recommendations are forwarded for responsible bodies at different levels. Since there is poor quality in components of medical records, particularly in administrative contents of data, monitoring and evaluation, Supportive supervision, induction/orientation, and on-the-job training should be provided for medical record personnel and staff of health centers related to medical records.

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Ethical considerations

Ethical clearance was obtained from Hawassa University, Institutional Review Board with Ref. No. IRB 146/14). During data collection, each respondent was informed through the study participant information sheet about the purpose, scope, expected outcome of the research, potential benefits and harms, confidentiality, and their right to withdraw at any time. Anyone who was not willing to participate was not forced to participate in the study. Informed written consent was taken from each participant just before data collection. To keep the confidentiality of the study subjects' information, personal identifiers were not included in the data collection format, and all recorded data were kept in a very secure area where only the principal investigator can access it. This research manuscript complies with the Declaration of Helsinki.

Data availability statement

All data are already described and included in the manuscript. Additional data will be made available on request.

Conflicts of interest

The authors declared that no conflicts of interest exist.

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