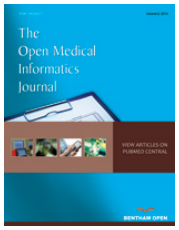

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RESEARCH ARTICLE

Primary Healthcare Data Management Practice and Associated Factors: The Case of Health Extension Workers in Northwest Ethiopia

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Abstract:

Background:

Collecting quality and timely healthcare data is crucial to improve health service performance.

Objective:

This study aimed at assessing data management practice and associated factors among health extension workers in East Gojjam zone, Northwest Ethiopia.

Materials and Methods:

An institution based cross-sectional study was conducted in 2014 among 302 health extension workers. Data were collected using a self-administered questionnaire and analyzed using SPSS version 20. The study objectives were described by descriptive statistics, and factors in data management were identified by multivariable logistic regression analysis.

Results:

A total of 302 health extension workers participated in the study. About 47.4% and 53.3% of respondents had good data management knowledge and practice, respectively. Inaccessibility of transportation, communication services, reference materials, and data collection/reporting formats were the mentioned challenges. Workload, data management knowledge, supervision, urban residence, reference materials access and clarity of formats were positively associated with better data management practice (p <0.05).

Conclusion:

Based on this study, the data management practice of health extension workers was low. Factors for low data management practice were organizational and technical related. Addressing knowledge gaps through professional development and improving supportive supervision are crucial to solve the problem.

Keywords: Data, Data management practice, Health extension workers, Factors, Ethiopia, Health Extension Program.

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1. BACKGROUND

With the objective of improving rural health care services, the Ethiopian government has implemented a nationwide Health Extension Program (HEP) at the community level since 2003. The program uses two to four female Health Extension Workers (HEWs) per Health Post (HP), the lowest level health facility, to serve for about 5000 people [1 - 8]. One of the important pillars of primary health care is a health information system to generate quality information for decision making [9 - 14]. Data management is a set of procedures for collecting, record keeping, processing, using, and communicating health care data [9 - 11, 14 - 16]. Due to geographic inaccessibility, infrastructure, and resource shortage, HEWs have used non-computerized data handling system [12, 13, 16, 17], which may end up in poor data quality, improper disease classification, unfair resource allocation, and poor planning [13, 16, 18 - 21]. About 85% of preventive health data are generated by HEWs,

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thus their data management practice requires attention [12, 13, 18, 20, 22].

Evidence from developing countries showed the presence of poor data management practice at the facility level [10 - 12, 17, 18, 20, 22 - 25]. Factors for poor data management practice include infrastructure, poor data management knowledge, poor management support, training, resource shortage, and vague data collecting formats [13, 15, 17, 22, 23, 25 - 28].

Although HEWs are major healthcare data sources to the Ethiopian healthcare system, little is known about their data management practice. Hence, this study aimed to assess the data management practice of HEWs in East Gojjam "Zone". The "Zone" is a second administrative level next to the Region and it is composed of a certain number of "Woredas". A "Woreda" is a smaller administrative area having an average of 100,000 population divided into the smallest administrative structure called "Kebele" which contains a minimum of 5,000 population [29].

2. METHODS AND MATERIALS

An institution based cross-sectional study was conducted in East Gojjam zone, containing 18 Woredas and 958 HEWs working in 402 HPs [29]. Due to resource constraints, only 40% of the Woredas are included in the study. There were 20 to 25 Kebeles per Woreda, 2 to 4 HEWs for each Kebele, and including all of the HEWs (302) from the randomly selected Woredas. Sample size was determined using Epi info version7 based on data management practice (P) =50% - no earlier study, 95% confidence level (CI), the margin of error (d) = ±0.05 and 10% non-response.

Data were collected using a pretested self-administered questionnaire adapted from the Amhara Regional Health Bureau HP supportive supervision checklist, and related studies [7, 14, 27, 30]. Seven supervisors and 21 nurse data collectors were trained and participated.

Data were edited and analysed using SPSS version 20 software. Descriptive statistics were used to describe the study objectives, and bivariable logistic regression analysis was used to identify factors of data management practice. Variables having $p<0.2$ on the bivariate analysis were further tested by multivariable logistic regression analysis to control confounding effect. Variables having $p<0.05$ were considered statistically significant to the data management practice.

The authors used the mean scores of knowledge and practice questions to measure the data management knowledge and practice of HEWs. Eight knowledge questions were asked to each HEW. The mean score of HEWs on knowledge questions was 15.38. and HEWs who scored ≥15.38 were grouped under knowledgeable. Likewise, each HEWs was asked six questions related to data management practice. The mean score of HEWs on data management practice questions was 8.27 and HEWs who scored the mean and above (≥8.27) were considered as good data managers. Based on this study, the HEWs were grouped as data users if they use routine healthcare data for at least one task beyond the reporting purpose.

The University of Gondar ethical review committee reviewed and gave ethical clearance. The Amhara Regional Health Bureau and East Gojjam District issued a support letter. Informed consent was taken from each participant after a detailed explanation of study objectives, data confidentiality, and data collection procedure.

3. RESULTS

3.1. Socio-demographic Characteristics of HEWs

A total of 302 HEWs participated in the study; 56.6% were aged between 28-35 years, and 51.3% had ≤5 years working experience. The majority (86.1%) HEWs were nine-month certificates, 87.1% were from rural, and 60% earned ≥1427 Birr ($61 USD) each month (Table **1**).

Table 1. Socio-demographic description of HEWs in East Gojjam Zone, Ethiopia, 2014.

Variables	Responses	Frequency (%)
Age	19-27 28-35	131 (43.4) 171 (56.6)
Religion	Orthodox Muslim	293 (97.0) 9 (3.0)
Educational status	Certificate Diploma	260 (86.1) 42 (13.9)
Marital status	Single Married Divorced	155 (51.3) 135 (44.7) 12 (4.0)
Residence	Rural Urban	263 (87.1) 39 (12.9)
Salary	< $61.1US ≥($61.1US	122 (40.4) 180 (59.6)
Experience	≤5 years >5 years	155 (51.3) 147 (48.7)
Paper based documents	No Yes	204 (67.6) 98 (32.1)
Softcopy documents	No Yes	208 (68.9) 94 (31.1)

3.2. Data Management Knowledge and Practice of HEWs

Over half (52.8%) of the HEWs had poor knowledge (scored below the mean 115.38 ±3.33) of knowledge questions. On the contrary, 53.3% were good data managers (scored above the mean 8.27±3.19) of data management practice questions (Table **3**).

3.3. Technical and Organization Related Factors to Data Management Practice of HEWs

About 61.6% HEWs faced difficulties in understanding reporting formats. Reporting format inconsistency (46.2%), unusual words (38.7%), and unclear abbreviations (15.1%) made reporting formats unclear. Nearly two-thirds (61.3%) HEWs were reported within a regular reporting period, and 45.4% faced challenges. The majority (85.1%, 94.7%, and 87.4%) of the HEWs reported the availability of reporting formats, supervision, and training on data management, respectively (Table **2**).

Table 2. Technical variables of HEWs to data management in East Gojjam Zone, Ethiopia, 2014.

Variables	Responses	Frequency (%)
User friendliness of Report format	Yes No	116 (38.4) 186 (61.6)
Why formats nonuser friendliness	Uncommon words Abbreviations Inconsistency of formats	72 (38.7) 28 (15.1) 86 (46.2)
Submitting report with definite time	No Yes	11 (3.6) 291 (96.4)
Regular reporting habit	Usually Sometimes delayed Usually delayed	185 (61.3) 109 (36.1) 8 (2.6)
Reason for Delay of reporting	Poor capacity to compile report Work load with other activity Negligence Other reasons	50 (42.7) 54 (46.2) 8 (6.8) 5 (4.3)
Presence of daily activity challenge	No Yes	165 (54.6) 137 (45.4)
Types of routine task challenges	Transportation Community resistance Distance from health post Community absenteeism Registration formats shortage	50 (36.5) 30 (21.9) 30 (21.9) 20 (14.6) 7 (5.1)

In this study, 272 (90.0%) of the HEWs used routine data: 109 (40.0%) for daily activities, 111 (40.8%) for planning, and 25 (9.2%) for monitoring and evaluation.

3.4. Factors Associated with Data Management Practice of HEWs

The regression analysis identified important factors in data management practice (Table **3**). HEWs who had knowledge of data management were 2.75 times more likely to be good data managers than their counterparts (odds ratio/OR/=2.75, 95% CI= 1.62, 4.60). The odds of being a good data manager were 1.86 times more among urban HEWs than the rural ones (95% CI= 1.11, 4.05). HEWs with adequate reference materials were 1.64 times more likely to be good data managers compared to the counterparts HEWs (95% CI= 1.12, 2.78). Trained HEWs were found to be good data management practitioners (OR= 2.78, 95% CI= (1.34, 5.71) compared to the non-trained groups. The odds of being a good data management practitioner was 1.82 times more among non-overloaded HEWs compared to overloaded HEWs (95% = 1.09, 3.78) (Table **3**).

Table 3. Factors to data management practice of HEWs in Northwest Ethiopia, 2014.

Variables	Response	Data Mgt Practice		COR (95%CI)	AOR (95%CI)
		Good (%)	Poor (%)		
Age of HEWs	19-27 28-35	82 (27.2) 79 (26.2)	49 (16.2) 92 (30.4)	1.95(1.19, 3.19) 1	1.45(0.82, 2.34) 1
Educational status	Diploma Certificate	29 (9.6) 132 (43.7)	13 (4.3) 128 (42.4)	2.16 (1.03, 4.61) 1	1.89 (0.91, 3.26) 1
Working experience	≤ 5 years >5years	90 (29.8) 71 (23.5)	65 (21.5) 76(25.2)	1.48 (0.92, 2.40) 1	0.76 (0.65, 1.98) 1
Monthly income	<$61.1US ≥ $61.1US	72 (23.8) 89 (29.5)	50 (16.6) 91(30.1)	1.47 (0.90, 2.41) 1	0.65(0.45, 1.68) 1
Residence	Rural Unban	133 (44.0) 28 (9.3)	130 (43.1) 11 (3.6)	1 2.49 (1.13, 5.57)	1 1.86 (1.11, 4.05)
Data management knowledge	Good Poor	99 (32.8) 62 (20.5)	44 (14.6) 97 (32.1)	3.52 (2.13, 5.84) 1	2.75(1.62, 4.60) 1
Reference materials access	Yes No	63 (20.8) 98 (32.5)	35 (11.6) 106 (35.1)	1.95 (1.15, 3.30) 1	1.64 (1.12, 2.78) 1
Training on data management	Yes No	150 (49.7) 11 (3.6)	114 (37.7) 27 (9.0)	3.23 (1.46, 7.26) 1	2.78 (1.34, 5.71) 1
Stationary materials access	Yes No	45 (15.0) 116 (38.4)	22 (7.2) 119 (39.4)	2.10 (1.14, 3.87) 1	1.83 (1.08, 3.36) 1
User friendliness of formats	Yes No	79 (26.2) 82 (27.1)	37 (12.3) 104 (34.4)	2.71 (1.62, 4.54) 1	2.18 (1.54, 3.91) 1

(Table 3) contd.....

Variables	Response	Data Mgt Practice		COR (95%CI)	AOR (95%CI)
		Good (%)	Poor (%)		
Presence of work load	Yes	124(41.1)	124 (41.1)	1	1
	No	37 (12.2)	17 (5.6)	2.18 (1.12, 4.27)	1.82 (1.09, 3.78)
Telecommunication service	Yes	53 (17.5)	27 (9.0)	2.07 (1.18, 3.66)	1.65 (1.07, 2.74)
	No	108 (35.8)	114 (37.7)	1	1
Electronics media (TV, radio, CD, flash…)	Yes	56 (18.5)	38 (12.6)	1.45 (0.86, 2.44)	0.88 (0.52, 1.84)
	No	105 (34.8)	103 (34.1)	1	1
Supportive supervision	Yes	153 (50.7)	123 (40.7)	2.80 (1.10, 7.29)	2.23 (1.07, 6.15)
	No	8 (2.6)	18 (6.0)	1	1
Transportation access	Yes	82 (27.2)	40 (13.2)	2.62 (1.58, 4.36)	1.78 (0.81, 3.71)
	No	79 (26.2)	101 (33.4)	1	1

NB. Data Mgt practice = Data Management practice

4. DISCUSSION

Primary healthcare units are major sources of routine healthcare data to the Ethiopian health system since they are in the rural settings where about 85% of country's population is living [11, 12, 22, 24]. Hence, poor data management in those facilities can affect the performance of the overall Ethiopian health system. To improve data management practice, adequate knowledge about data and its management is needed [11, 12, 22].

In this study, only 47.4% of the HEWs had good data management knowledge. This clearly indicated that over half of the HEWs practiced data management without knowhow, which leads to poor data and decision quality [11, 16, 24]. This finding is slightly lower compared to study findings from Southern Ethiopia [16], where 58.2% of HEWs had good data management knowledge. The difference could be due to training access where 42% of HEWs from Southern Ethiopia took training on data management, but only 12.6% from East Gojjam had training.

Based on the current study, only 53.3% of the HEWs had good data management practice. This could highly affect the decision-making practices of the Ethiopian health system in terms of resource allocation, planning, service quality and equity. The current data management practice was different from study findings in Southern Ethiopia [16], where 74.3% of HEWs were good in data management. This discrepancy could be due to differences in data management knowledge [limited training], and unclear formats. Geographic location, community type, and supervision may also play an important role in making such differences. On the contrary, it was higher compared to study findings from Ethiopia [12] -33.3%, and a single study from Gaza and Palestine [31], where data management practices were 11.0%, and 18.0%, respectively. Study period, area coverage, and instability may cause this variation.

Majority of the HEWs reported the presence of scarcity of data management inputs (Table **2**) due to no electric power, supervision, communication, and transportation in HPs. All these could have an impact on data quality and management [11, 16, 17, 22]. Evidence-based practice in the Ethiopian health system would be challenged unless health information system officials give special attention to it [4, 6, 16, 19, 32].

Based on this study, 90.4% of the HEWs used health data; 40% for daily activities, 40.8% for planning and 9.2% for evaluation. This greater figure may be due to the weaker definition given for health information use in this study; using data for at least one activity in addition to reporting which may lead to an artificial increase. This utilization was higher compared to study findings from Jimma [33], and North Gondar [34], where daily data utilizations were 26.7% and 22.5%, respectively. It could be due to differences in the study period and awareness level. However, it is lower compared to study findings from Southern Ethiopia [16] where 87% of the HEWs used data for decision making.

Urban HEWs showed better data management practice (OR=1.86, 95% CI= [1.11, 4.05]) compared to the rural HEWs which could be due to relatively better access to transport, materials, information, and supervision. In addition, their overall education level (urban- three years diploma certificate, and rural nine months certificate) may cause the variation [11, 24].

HEWs having good data management knowledge were more likely to be good data managers compared to counterpart HEWs (2.75 [1.62, 4.60]. It is clear that data management knowledge is a prerequisite to data management practice. Likewise, access to the reference materials was a key factor in data management practice of HEWs (Table **3**). Various studies supported this finding [4, 10, 11, 16, 24, 32]. Congruently, HEWs with no communication access were poor data management practitioners compared to their counterparts. Likewise, the workload was a key factor in poor data management practice of HEWs. It is because of time shortage to practice on routine data, and evidence from Ethiopia supported this finding [16, 32 - 34].

CONCLUSION

The data management knowledge and practice of Ethiopian HEWs are poor. Improving infrastructure, communication media, professional development, management supports, training, and reference materials access are important to solve the problem. We suggest a large scale qualitative study to identify enabling and barrier factors at individual and organizational domains.

LIMITATIONS OF THE STUDY

Recall bias may lower data management practice level and the study was not adequately supported by qualitative data. Determining data management knowledge and practice using

the mean score of knowledge and practice questions may also be a limitation to this study.

AUTHORS' CONTRIBUTIONS

All participated in proposal development; SY handled data collection; all did data edition/ analysis; and MA did the manuscript draft, and review process.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The University of Gondar ethical review committee reviewed and gave ethical clearance.

HUMAN AND ANIMAL RIGHTS

No animals/humans were used for studies that are the basis of this research.

CONSENT FOR PUBLICATION

Written informed consent have been obtained for the study.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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