

Research Article

Gender and Sex Integration in Routine Health Information Systems in West Africa: Evidence from Senegal

Ndeye Mareme Sougou^{1,*} , Cheikh Tacko Diop² , Adama Faye¹ 

¹Service of Public Health, University Cheikh Anta Diop, Dakar, Senegal

²Service of Public Health, University Alioune Diop, Bambey, Senegal

Abstract

Introduction: Gender and sex data are important for accessing health services and defining health problems. However, they are not effectively integrated into most routine health information systems in developing countries. The aim of this study is to examine the extent to which gender and sex data have been integrated into Senegal's routine national information system. **Methods:** This was a qualitative study. In-depth individual interviews were conducted with health personnel. These were implementers at the community level (data collectors and public and private service providers (health data managers in private and public health facilities) and strategic-level managers of the HIS in Senegal (head of the national health information system). A total of 43 people was included in the study. The data collected in local or French were transcribed and analyzed thematically using NVIVO 11 software. **Results:** Results show that while healthcare providers recognize the importance of the health information system for decision-making, there are substantial gaps in knowledge and understanding of gender concepts. Gender is frequently conflated with biological sex, and sex-disaggregated data are rarely analyzed or used to inform decisions. Furthermore, the DHIS2 reporting and analysis tools were perceived as insufficiently gender-sensitive, limiting their ability to capture gender-related disparities in access to healthcare services. As a result, gender considerations remain marginal in routine data analysis and coordination meetings. It was also noted that the DHIS2 tool, which is the main IT tool for reporting and processing health information, was not sufficiently gender-sensitive. **Conclusion:** This study has shown that there is a gap in knowledge and training in gender concepts among healthcare providers involved in the management of Senegal's routine HIS. It also highlights the gender insensitivity of the collection, reporting and processing tools used in the routine health information system. Decision-makers should therefore take these shortcomings into account by initiating training for providers and by re-engineering the IT system to take gender into account.

Keywords

Gender, Sex, Routine Information System, Senegal

1. Introduction

In developing countries, studies have examined the importance of taking gender into account in healthcare systems [1]. The intersection of gender with other social stratifiers, the

influence of gender-related social norms on health system structures and processes, and the role of gender in policy have been identified as themes indicating the relevance and neces-

*Corresponding author: ndeyemaremesougou1@gmail.com (Ndeye Mareme Sougou)

Received: 20 November 2025; **Accepted:** 18 December 2025; **Published:** 31 December 2025



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sity of gender analysis in health systems research [1]. The health information system (HIS) is designed for the collection, processing, use and dissemination of health-related data to improve healthcare outcomes. It is one of the pillars of health systems and often reflects the reproduction of gender inequalities in societies [2]. In general, gender and gender-specific data enable health data to be analyzed in a more focused, refined and targeted way. Disparities between the sexes and gender can affect access to healthcare [3]. There is also evidence that sex and gender are modifying variables in the most common causes of death and morbidity, and articulate the genetic, biological and environmental determinants that underlie these differences [4]. For example, heart failure contributes disproportionately to coronary heart disease mortality in women, which could be due to undiagnosed ischaemic heart disease in women, but also male predominance in cancers affecting both sexes is evident worldwide, across all races and ages [4]. There are numerous examples showing that these 2 variables affect not only the epidemiology of morbidity but also access to treatment in communities. Yet studies have shown that not only are the terms 'sex' and 'gender' often used interchangeably, and that they often have a limited and binary scope, but there are also significant variations in the degree of inclusion and comprehensiveness of their use depending on geographical distribution [5]. Beyond its technical function, the health information system is embedded within social and institutional structures that may reproduce existing inequalities, including gender-based disparities. Evidence from low- and middle-income countries shows that health systems are not gender neutral and that data collection, reporting, and use often reflect prevailing social norms and power relations [1]. Gender-sensitive health information is therefore essential to identify inequities in access to care, service utilization, and health outcomes, and to inform equitable health policies.

International frameworks emphasize the importance of integrating gender into health information systems as a core component of health system strengthening. The World Health Organization highlights gender mainstreaming as a critical managerial and analytical approach for improving health system performance and equity [6]. Similarly, the Health Metrics Network framework underscores the need for routine disaggregation of health data by sex and other social stratifiers to support evidence-informed decision-making [7]. However, despite these recommendations, the integration of gender considerations into routine health information systems remains limited in many African countries.

When looking at health information systems in African countries, attention should be paid to the integration and consideration of gender and sex data in health information.

However, we have not found any studies that have analyzed the integration of gender into routine health information systems in African countries. Elsewhere, in developed countries, studies have shown that gender-sensitive data collection is carried out and is considered important by communities [8]. To address this gap, this study aims to investigate the level of integration of gender and sex data into Senegal's routine information system.

2. Materials and Methods

2.1. Type of Study

This was a descriptive, observational, cross-sectional study based on a qualitative approach that was conducted from 06 Jun 2019 to 20 August 2019. It was an exploratory case study. Two regions were chosen as case studies (Thies and Kedougou) located in the west and south-east of Senegal respectively. In these regions, urban and rural health districts were enrolled.

2.2. Sampling

Purposive sampling was used for key informants. The choice of respondents was based on the representativeness of the sample within the diversity of the study target.

As this is social science research, the size was determined as the data was collected and analyzed in an iterative process [7]. The aim is to seek out the wealth of information and reach saturation or understanding of all the categories in the data. In this way, the size was not known until saturation had been reached and no new information had been generated by interviews.

The inclusion criteria were that the key informants were:

- 1) Senegalese.
- 2) involved in collecting, processing or analyzing data from Senegal's routine health information system.
- 3) over 18 years of age.

The in-depth interviews involved strategic players (District Management Team/Regional Management Team), healthcare providers (ICP, midwives, hospital nursing supervisors), community healthcare players (healthcare, promotion and prevention), members of the local community, private sector healthcare players (for-profit private sector, non-governmental organizations), mutual health insurance scheme agents and other users of data on mothers, children and adolescents (school and academy inspectorate agents) (see Table 1).

Table 1. Distribution of Interviewees By District and Type of Stakeholder.

	Health ad- ministrators	Service pro- viders	Mutual health insurance agents	Private		Health adminis- trators	Service providers	Mutual health insurance agents
Thies	2	3	-	1	5	-	-	11
Mbour	1	4	2		3	1		11
Kedougou	1	2	1	3	1	1	1	10
Saraya	2	2	-	-	3	1	-	8
Total	6	11	3	4	12	3	1	40

2.3. Data Collection

In-depth individual semi-directive interviews (40) were carried out using interview grids (individual interview grid). Key informants from the central decision-making level were also interviewed. Two interviewers were mobilized to conduct the individual and group interviews. Dictaphones were used to record the data, the verbatims of which were transcribed by the team and sent to the research team. In each health district, a supervisor who was a member of the research team was responsible for organizing the data collection. An interview guide with open-ended questions was used during all the interviews. Each interview lasted an average of 60 minutes.

2.4. Validation of Results

Data triangulation was used to ensure the validity of the results. The principle of triangulation was respected through the diversification of data collection methods (in-depth individual interviews and focus groups) and the multiplicity of data sources. In addition, the variation in the profile of the players interviewed guaranteed the principle of seeking divergent explanations.

2.5. Analysis Methods

The data was analyzed by creating a theoretical corpus from the full transcriptions of the interviews. The data were analyzed using thematic analysis. All interviews were transcribed verbatim and imported into NVivo 11 software for analysis [9]. An inductive coding approach was applied, allowing themes to emerge directly from the data [10].

Coding was conducted iteratively by members of the research team. Initial codes were discussed collectively, and discrepancies were resolved through consensus to enhance analytical rigor. Data triangulation was ensured through the diversity of participants' profiles and levels within the health system, as well as through the comparison of perspectives

across public, private, and community-based actors. This process strengthened the credibility and validity of the findings. The themes addressed were: perception of the routine nursing system, providers' knowledge of gender and sex, providers' perception of the importance of gender and sex variables, and the degree of integration of these variables in the various stages of collecting, processing, analyzing and using SIS data.

2.6. Ethics Approval and Consent to Participate

The study was approved by the National Comity of Ethical for Research in Health (CNER) Protocol SEN18/83. A complete and intelligible information letter and a free and informed consent form to be signed were given to everyone who took part in the study.

3. Results

Stakeholders' perception of the health information system

The Health Information System (HIS) is "Important" for providers. Its primary importance lies in its usefulness. The HIS makes it possible to provide information on the status of indicators, to detect problems with the health posts and, finally, to make decisions. For most providers, it is a decision-making tool.

"I think it's important because when I do the reports, I can find out where there are problems and see."

Midwife Mbour

Depending on the function and position of the healthcare actor, the roles in the SIS are perceived in different ways. For most, their role in the SIS is perceived as important.

The Head Nurses describe their role as one of preparing and transmitting reports. In their view, they have the greatest responsibility, which is to provide the data. For them, the data is "first and foremost the health post". So, they are responsible for collecting the data, checking its reliability and passing it on.

"We have a big role to play in the SIS, because the data comes first from the health post... First of all, I'm the one who

collects the data every month. First of all, I check that the data is reliable, that it conforms and all that before transmitting it.

Head Nurse of Health Post – Mbour

Other healthcare players have more or less similar roles. In hospitals, the role of nursing managers is to collect, analyze and share health data with hospital staff.

The health district administrators interviewed said that their role was one of supervision and control. According to them, they are responsible for ensuring the quality of the data, as well as compliance with the data transmission chain by ensuring that the data are prompt and complete.

The role of community players in the SIS is not well defined by them. However, they acknowledge that they have an equally important role. This role is subject to the fact that they are the agents in the field who work with the communities. By working with the communities, they encourage people to go to the health facilities and therefore encourage the production of health information.

"In our work, we handle information. For example, when pregnant women come for a consultation, we are the first ones to take their vitals (weight, blood pressure, height, brachial perimeter, etc.), then we give the woman the sheet on which these vitals are recorded and tell her which room the midwife will be consulting.

Community health worker, Kédougou

The main reporting tool of the Health Information System is the DHIS 2. The DHIS2 is described as a high-performance IT tool for collecting and processing health data produced at all levels of the health system. Most of the DHIS2's uses are limited to data collection. It is at the level of certain healthcare providers in the medical regions that the usefulness of data analysis is noted.

According to some service providers, the main strength of DHIS2 is that the data is collected and transmitted in good time

Perception of gender by healthcare providers

Knowledge of gender and its use in the SIS

For most providers, gender is the biological differentiation between male and female. And some of the providers interviewed said they did not know what gender was.

"Do I understand what this is about? Please explain. I hear it talked about a lot, but I don't really understand the concept of gender", or a nurse in Kedougou who said: "I don't know anything about gender... I've had no training on the subject".

Chief midwife in Thies

According to the providers, this lack of knowledge was linked to insufficient training on gender and gender issues.

Most of those who say they know about gender claim that it is a new, fashionable and topical concept. Some program, such as the malaria control program, have integrated gender and ask providers to specify the sex of the patient.

Definition of gender according to a health provider Saraya (woman): *"Gender is a concept that refers to the non-biological differences between men and women that are established by society".*

In terms of usefulness, some of those interviewed believe that gender helps to improve equity and equality between men and women

According to the latter, taking gender-related aspects into account would enable health indicators to be improved.

"...I think it's important to do a gender analysis because that will enable us to see if there are really more women attending who are ill, so we can see what the cause is. Or if men aren't coming or women aren't coming to programs like FP and all that, we can see now what the problem is because it may be due to a problem with the people. So if we do it, it's important.

ICP Mbour

Taking gender into account in data collection tools

The reporting tool (DHIS2), according to these same providers, has flaws in gender mainstreaming. This is the case in the reporting of STIs, as one midwife from Thiès put it. In this particular case, the DHIS2 does not consider the "has not been consulted" option and considers all men to be free of STIs.

"Gender doesn't even feature in the data, i.e. in the reports and so on, except in the STI section. In the STI section, there are women and men. But in general, the male part, if you look at the DHIS, is not mentioned. There are dashes. In the hard report, there are dashes. But in the DHIS, there are no lines. It doesn't use dashes. You have to put zeros when they're not zeros. You haven't seen them. That's another problem.

Chief Midwife (Saraya)

According to the national health information management stakeholders interviewed, the DHIS2 tool is not yet sufficiently gender-sensitive. However, the tool does have the potential to integrate gender data, given its importance in informed decision-making.

"DHIS2 can be improved to make it more gender-sensitive; in fact it's our reporting system that we've photographed in DHIS2 and if our activity reports don't take these "gender" dimensions into account, DHIS 2 won't in turn take these gender dimensions into account. However, it is possible to take gender aspects into account in the development of DHIS2.

National Manager

Taking gender into account in analysis

With regard to data analysis, information on sex is not used according to the providers. In most of the reports, data on sex is not included, according to some providers, and the data analyses do not specify the differences linked to sex or gender. A nurse in charge of a health post in the urban town of Mbour described how, despite the inclusion of gender and sex in data collection tools, the data were not used or analyzed: *"At the moment, we can see that almost all the tools have included sex. However, we don't use this data in our reports".*

This is also the case in private health facilities. In these, data on sex and gender are not used.

"...when it comes to information on gender, there's male, female and child sex. But we don't analyze gender. But it's important all the same. It's important."

Private health provider (Thiès)

Furthermore, at district coordination meetings, where the results of data collection are shared, gender-specific aspects are not shared. According to the service providers, the reasons for this lack of sharing are linked to insufficient training on gender and insufficient appreciation of its importance.

4. Discussion

Perception of gender among healthcare providers

The results of the study showed that gender concepts were generally unfamiliar to most of the health workers surveyed. Some of the providers surveyed said they did not know what gender was. The other providers who said they were familiar with gender issues said that gender was a new, "fashionable" concept. In their view, it was a new concept being used by health programs. For most healthcare workers, gender often boils down to sex. The lack of knowledge of gender has been identified by other studies in Africa, which have shown that professional knowledge of gender is limited [11].

The main reason for this lack of understanding gender and related concepts was insufficient training on the subject. Most of the service providers involved in the SIS had never received gender training. Only 2 of the providers interviewed had received gender training from projects visiting their locality. Other studies had also shown that healthcare providers involved in the organization and administration of healthcare systems were generally not trained in gender [12, 13]. Similarly, untrained providers tended to consider the collection of gender-sensitive data irrelevant in most clinical circumstances because similar care is provided to all patients [6]. However, the knowledge gaps highlighted among healthcare professionals could be addressed by training courses that have proved effective in other contexts among healthcare workers [14].

Gender and sex in health data collection

Senegal's routine health information system (SISR) collects data on sex and age groups. The specifications (male/female) are found in all the HISR collection tools except those at community level. The use of non-standardized tools at community level is responsible for a lack of quality in health information systems, as in other African countries such as Tanzania [15].

Senegal, like many countries in sub-Saharan Africa, uses the District Health Information Software 2 (DHIS2) in its routine health information system. DHIS2 is the largest health management information system (HMIS) platform in the world, used by 72 low- and middle-income countries. Two billion people (30% of the world's population) live in countries where DHIS2 is used [16]. Countries are free to program into this IT tool the health indicators they feel are most relevant for monitoring their health program. However, the service providers surveyed in Senegal's HISR noted shortcomings in the integration of gender and sex in the DHIS2 tool. This is the case in the reporting of sexually transmitted in-

fections (STIs), as stated by a midwife in Thies, whose tools are only available in maternity wards, leaving out the reporting of STIs for men. In addition, the DHIS2 officers at central level confirmed that the DHIS2 was insensitive to gender mainstreaming. This has been reported by other studies in other countries, where several gender-related data are not reported by the routine information system, resulting in a violation of human rights in some cases [17]. The findings of this study highlight structural limitations in the integration of gender within Senegal's routine health information system, particularly in relation to the DHIS2 platform. Although DHIS2 is widely used in low- and middle-income countries and offers significant potential for health data management, its effectiveness depends on how indicators are designed and utilized at country level (Dehnavieh et al., 2019) [18]. In line with previous studies, our results suggest that gender-related variables are insufficiently embedded in reporting templates and are rarely exploited during data analysis and coordination meetings. Similar challenges have been documented in other African settings, where routine information systems collect sex-disaggregated data but fail to translate them into meaningful gender analyses for decision-making (Hotchkiss et al., 2012) [19].

Gender and sex in analysis and use of data

In both the private and public sectors, providers acknowledge that information on gender was not used or analyzed. In most of the monthly analysis reports from the health districts, data is not disaggregated by sex. Gender and sex-specific data in health systems are not sufficiently exploited [20]. It should be noted, for example, that gender analysis is not often carried out by the agents involved in the health information system (HIS). Local gender norms could influence the perception of which data is "important" to analyze and the resulting attitudes towards handling this data, as is the case when taking into account data on LGBTQ+ (lesbian, gay, bisexual, trans, queer and other) people in certain countries [21]. However, numerous interventions have been put in place in the context of caring for these vulnerable people. These interventions are documented exclusively by parallel information sub-systems (HIS_IHV) and not in the routine information system. However, it should be emphasized that, as some of the managers interviewed acknowledged, this information could contribute to informed decision-making. In some countries, gender analyses have enabled decision-makers to improve the provision of sexual health care and general medicine [22] but more generally to improve informed decision-making at the political level by decision-makers [23]. This was the case in Sydney, Australia, where the analysis of gender data led to an increase in the registration of sexual orientation and the detection of STIs [24].

These findings have important implications for health system strengthening in Senegal. The limited understanding of gender concepts among healthcare providers and the underutilization of sex-disaggregated data suggest a need for

targeted capacity-building interventions. Integrating mandatory gender-sensitive modules into pre-service and in-service training curricula could improve providers' ability to collect, analyze, and use gender-related data. In addition, revising DHIS2 reporting templates to systematically incorporate gender variables would enhance evidence-informed decision-making and contribute to more equitable health service delivery.

5. Conclusions

This study highlights persistent gaps in the integration of gender and sex within Senegal's routine health information system. These gaps are evident at all stages of data management, from collection to analysis and use. Addressing these shortcomings requires both structural and capacity-building interventions, including the integration of gender training for healthcare providers and the re-engineering of routine information system tools to ensure gender sensitivity. Strengthening these components could support more equitable health policies and improve the responsiveness of the health system to the needs of different population groups.

Abbreviations

DHIS2	District Health Information System 2
HIS	Health Information System
LGBTQ	Lesbian, Gay, Bisexual, Trans, Queer and Other

Acknowledgments

We would like to express our sincere gratitude to all health workers for their support and collaboration throughout this work. Their contributions were invaluable to the successful completion of this project.

Author Contributions

Ndeye Mareme Sougou: Conceptualization, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Cheikh Tacko Diop: Conceptualization, Investigation, Writing – original draft, Writing – review & editing

Adama Faye: Conceptualization, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing

Funding

No funding.

Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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Biography



Ndeye Mareme Sougou is a medical doctor, pediatrician, and Professor of Public Health at Cheikh Anta Diop University of Dakar, Senegal. She holds a PhD in Public Health and Master's degrees in Health Socio-Anthropology and Public Health, with a specialization in Monitoring and Evaluation of Health Policies and Programs. Her research focuses on social and gender inequalities in access to health services, with a particular interest in maternal, child, and adolescent health. Prof. Sougou teaches courses on qualitative research methods, health systems evaluation, and policy analysis. She has authored numerous publications in national and international peer-reviewed journals and serves as a mentor to early-career researchers in West Africa. Deeply committed to advancing women's leadership in science and medicine, she actively promotes collaborative, inclusive, and equity-driven approaches to research and training across the region.

Research Field

Ndeye Mareme Sougou: Public health, Medical anthropology-Gender inequities, Evaluation.

Cheikh Tacko Diop: Health economy, Public Health.

Adama Faye: Public health, Medical anthropology-Gender inequities, Evaluation.