Indonesian Journal of Digital Business

Journal homepage: https://ejournal.upi.edu/index.php/IJDB

# Designing a Web-Based Midwifery Dashboard with Pureshare Approach and Drill-Down Features

*Ani Anisyah[1*], Asep Wahyudin[2], Makhi Zainul Urfi[3]*

[1,2,3] Program Studi Ilmu Komputer, FPMIPA, Universitas Pendidikan Indonesia
Correspondence: E-mail: anianisyah@upi.edu

**ABSTRACT**

Health-related concerns remain a central focus in public policy, with maternal and child health identified as a critical priority. Midwives play a vital role as frontline providers of maternal healthcare services, and their impact can be significantly enhanced through the integration of technological solutions. However, continued reliance on manual data collection methods hampers the timely availability of essential information, thereby limiting the ability to make prompt and informed decisions. This research aims to support healthcare executives in making timely, evidence-based clinical decisions through the implementation of an executive dashboard system. The dashboard employs a drill-down approach to facilitate detailed data analysis and enhance information accessibility. Development of the dashboard is guided by the Pureshare method, which comprises five key stages: (1) planning and design, (2) system and data evaluation, (3) prototype design, (4) prototype refinement, and (5) final release. The findings of this study resulted in the design of five primary dashboard menus based on midwifery service Key Performance Indicators (KPIs). These menus include: the main executive dashboard, community participation in midwifery services, contraceptive usage trends, pregnancy services, childbirth services, and immunization services—each designed to provide comprehensive insights into the performance and quality of midwifery care.

**ARTICLE INFO**

***Article History:***
*Submitted/Received 15 April 2025*
*First Revised 17 April 2025*
*Accepted 28 April 2025*
*First Available online 30 April 2025*
*Publication Date 30 April 2025*

***Keyword:***
*Midwife Services,*
*Executive Information System,*
*Dashboard,*
*Drill Down*

## 1. INTRODUCTION

The health sector is increasingly recognized as a critical area of national development and has garnered significant governmental attention in recent years. This growing focus presents substantial opportunities for integration with information technology to improve service delivery and outcomes (Sumihar & Wijaya, 2021). Within this sector, midwifery plays a pivotal role as a frontline healthcare profession, providing essential maternal and child health services. These include care for pregnant women, laboring mothers, newborns, and young children (Prasetyawati, 2019). Collecting clinical data is critical to the survival of midwifery practice. Without statistics documenting care methods and outcomes, the consequences of midwifery care are nearly undetectable (Walker et al., 2008). Despite its importance, much of the data in midwifery services is still recorded manually, often in physical logbooks. This outdated approach leads to frequent data loss, delays in reporting, incomplete records, and inefficient data presentation processes (Martunus et al., 2019). Consequently, the development and implementation of a robust maternal health information system are essential. Such a system would not only streamline data collection and management but also support healthcare professionals in transforming raw data into actionable insights for policy-making and clinical decision-making (Weiner, 2015) (Sutisna et al., 2024).

There is an urgent need for midwives and other key stakeholders, including governmental institutions, to collect strategic, accurate, and real-time information to effectively support the development of public health initiatives (Bimaniar et al., 2018). Accessible and timely data are essential in facilitating evidence-based decision-making processes aimed at addressing complex health challenges. Stakeholders bear the responsibility of ensuring that decisions are guided by relevant, reliable, and valid information to promote operational efficiency and successful program implementation. Decision-making at both strategic and operational levels can be significantly enhanced using advanced data processing tools integrated within an Executive Information System (EIS) (Fatoni, 2019). An EIS is specifically designed to provide high-level executives with rapid access to critical information, enabling them to identify issues, monitor key performance indicators, and make informed decisions based on comprehensive data outputs (Miftasari, 2011).

Unlike conventional information systems, Executive Information Systems (EIS) are specifically designed to assist executives in accessing the information they need, precisely when they need it, and in a format that is most conducive to strategic decision-making. A key component of EIS implementation is the dashboard, which presents information visually to support managerial functions by delivering relevant, real-time data. Dashboards play a critical role in enabling executives to monitor organizational performance, track the progress of strategic initiatives, and assess the achievement of key work targets (Gumilang & Sutari, 2018). For healthcare stakeholders, dashboards must be carefully designed to provide access to key performance indicators (KPIs) that align with the organization's strategic objectives. The use of data visualization within these dashboards is essential, as it enhances stakeholders' ability to interpret complex data efficiently and make evidence-based decisions (Pestana et al., 2018).

One established method for developing Executive Information Systems (EIS) in the form of dashboards is the Pureshare method. This approach, developed by the Pureshare vendor, is designed to support the creation of dashboards that facilitate organizational performance measurement and management initiatives. The method emphasizes aligning technological solutions with strategic business objectives, thereby promoting a balance between

information technology and organizational goals. Given the inherent complexity of executive decision-making processes, it is essential to incorporate analytical techniques—such as the drill-down function—that enable users to explore data in greater depth when required. The drill-down technique allows decision-makers to begin with high-level summary information and progressively access more detailed, hierarchical data. This layered approach supports more precise analysis, enabling users to justify decisions with comprehensive, context-specific information (Ridwan Pranata, 2021) (Yunus et al., 2020) (Leod et al., 2008).

Several studies have emphasized the role of health application dashboards in supporting governance processes for healthcare service delivery across various regions. The application of interactive dashboard visualization has been demonstrated as an effective tool for conducting advanced analyses of health-related data. In particular, the incorporation of drill-down features within interactive dashboards facilitates user engagement by allowing deeper exploration of layered information, thereby enhancing the capacity to extract insights for strategic decision-making (Gumilang & Sutari, 2018) (Colley et al., 2016) (De Croon et al., 2015). The development of dashboards using the Pureshare method has been shown to effectively support decision-making processes by enabling the monitoring of organizational data within healthcare institutions. Such dashboards are typically refined through iterative feedback from stakeholders to improve their design and functionality, ensuring that they serve as practical tools for executive decision-making (Maulana et al., 2018) (Pestana et al., 2020).

Considering the urgent need for fast, accessible, real-time, and detailed information—particularly related to maternal healthcare, this study aims to develop a web-based executive dashboard for midwifery services. The dashboard will present key indicators related to midwifery, including vaccination, family planning, pregnancy, childbirth, and infant care, tailored to meet the information needs of decision-makers. By utilizing the Pureshare method in combination with the drill-down visualization approach, the proposed dashboard seeks to enhance the ability of health executives and policymakers to monitor service performance and implement timely interventions to improve maternal and child health outcomes.

## 2. METHODS

The Pureshare method is a dashboard design framework developed by the Pureshare vendor to facilitate the development of systems aimed at managing and measuring organizational performance, including the creation of executive dashboards (Kusnawi, 2011). This method employs a top-down design strategy combined with a bottom-up implementation approach, ensuring a comprehensive understanding of both user requirements and system capabilities. Central to this methodology is active user involvement throughout the development process, which consists of six key stages: Planning and Design, System and Data Review, Prototype Design, Prototype Improvement, Release, and Continuous Improvement.

1. Planning and Design
   This initial stage emphasizes identifying the business needs of users and defining the critical features to be presented on the dashboard. Conducted using a top-down approach, it focuses on aligning the dashboard with strategic objectives by identifying key performance indicators (KPIs) that serve as the foundation for determining the necessary information and layout structure.

2. System and Data Review
   This stage is carried out concurrently with the design and planning stages. The bottom-up implementation approach is carried out to analyze existing data and identify data sources, such as how to access it, build quality measurements of existing data, and the suitability of available data with the needs outlined in the previous design and planning stages.
3. Prototype Design
   At this stage, a dashboard prototype is developed based on insights gained from both top-down and bottom-up approaches. The prototype serves as a visual and functional model, providing stakeholders with an initial version for review and evaluation.
4. Prototype Improvement
   User feedback is gathered through collaborative testing of the prototype to refine and optimize dashboard functionality. This stage ensures that the dashboard effectively meets user expectations in terms of usability, accuracy, and system integration.
5. Release
   The dashboard is deployed within its actual operational environment. Prior to full implementation, rigorous testing is conducted to validate that the system meets the objectives defined in the earlier phases, ensuring its readiness for real-world application.
6. Continuous Improvement
   Post-implementation, the dashboard undergoes ongoing evaluation and enhancement to adapt to evolving organizational needs. This iterative process helps maintain the relevance and effectiveness of the dashboard over time, ensuring its sustained value as a decision-support tool.

Drill Down Detailing is a feature of extreme importance that adds more value to the dashboard. This idea is defended by some authors. Using the dashboard technology properly, that "A single page is rarely sufficient to present all the relevant performance metrics, and therefore the dashboard must have a drill down capability" (Baskett et al., 2008).

The drill down technique, when used in dashboards, offers stakeholders with intelligent analysis due to the level of detail it can assure; it can even produce granular information through various strategies such as filtering and zooming (Ghazisaeidi et al., 2015). Furthermore, the drill down technique enables the ability to analyze indicators, present answers to decision makers' questions, and support the creation of multiple types of perspectives with varying levels of detail, allowing the materialization of the big picture of that information (Gordon & Richardson, 2013). Furthermore, the research design stage proposed in this study is to combine two dashboard design methods with the pureshare and drill down methods framed by the ADDIE research method (Analyze, Design, Develop, Implement, Evaluate) which is depicted in **Figure 1**. The research design starts from the problem identification stage to the publication and documentation stage. A detailed explanation of each stage carried out is as follows:

1. Analysis Stage
   The research stage begins with the planning and design stage consisting of problem formulation activities, system and data needs analysis.
2. Design Stage
   At this stage, a detailed system and data review is conducted, encompassing activities such as data collection and analysis to determine the dashboard's purpose. This includes identifying target users and dashboard types, defining key performance indicators (KPIs), and establishing user requirements for the dashboard interface. Based on this

information, dashboard mockups and corresponding database designs are developed to guide the next phase.

3. Development Stage
   The development stage focuses on translating the analysis and design outputs into functional components. Program code is written to develop a web-based dashboard prototype. Prior to deployment, comprehensive final testing is conducted using black box testing methods.


**Figure 1.** Research Design

4. Implementation Stage
   During implementation, the prototype is deployed through limited user testing, often referred to as beta testing. To assess usability and relevance, a focused discussion is conducted with end-users, including midwife coordinators and practicing midwives. Users

are invited to interact with the dashboard and provide feedback regarding the accuracy, usefulness, and completeness of the information presented

5. Evaluation Stage
   The final stage involves evaluating the overall outcomes of the research process. Conclusions are drawn based on findings from each development phase, including user feedback, testing results, and the dashboard's performance. This stage ensures that the objectives of the study have been met and provides insights for future enhancements.

## 3. RESULTS AND DISCUSSION

### 3.1. Planning Result

At this stage, data collection was conducted to assess user requirements for the development of a midwifery service dashboard using a top-down approach. The aim of this process was to ensure that the dashboard aligns with user needs and organizational objectives. The key findings from the user needs assessment are presented below:

1. Identification of Dashboard Objectives
   The primary objective of developing the dashboard is to provide midwives with a comprehensive, real-time summary of service activity reports. This system is designed to enable users to customize the information displayed according to their specific roles and preferences, thereby enhancing their focus on the most relevant aspects of their clinical practice. By achieving this objective, the dashboard is expected to serve as a valuable decision-support tool that facilitates timely and accurate reporting on midwifery services. System use case diagram shown in **Figure 2**.

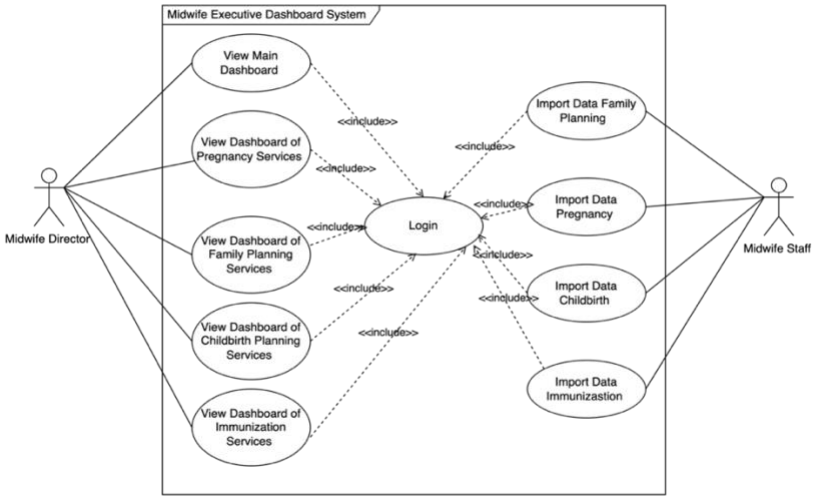


**Figure 2.** Use case of executive dashboard system

2. Identification of Dashboard Users
   The intended users of the dashboard, as illustrated in **Figure 2**, are practicing midwives and midwife leaders. Midwives will utilize the dashboard to monitor clinical metrics such as the number of patient visits, pregnancy and childbirth statistics, and contraceptive usage. In contrast, midwife leaders will benefit from a broader perspective, using the dashboard to access aggregated data, monitor service performance trends, and support strategic planning and decision-making at the organizational level.
3. Identify dashboard types
   The dashboard designed in this study is classified as a strategic dashboard, reflecting its purpose of providing high-level, holistic insights into midwifery service performance.

Accordingly, the dashboard in this study is tailored to present midwifery service indicators in a format that facilitates long-term planning and service optimization.

4. Determination of Key Performance Index

The selection of Key Performance Indicators (KPIs) was informed by a combination of user interviews and an extensive review of relevant literature. Specifically, the KPIs were derived from the Maternal and Child Health Nutrition performance indicators outlined in Indonesia's 2020–2024 National Medium-Term Development Plan (RPJMN), as documented by the Directorate of Nutrition and Maternal and Child Health (Pusat Kebijakan Kesehatan Global dan Teknologi Kesehatan, 2022). The RPJMN document outlines 14 key indicators related to maternal and child health, which serve as the foundational metrics for assessing midwifery service performance within the dashboard framework. Maternal Mortality Rate (MMR):

a. Infant Mortality Rate (IMR)
b. Neonatal Mortality Rate (NIR)
c. Prevalence of Stunting (short and very short)
d. Prevalence of Wasting (undernutrition and poor nutrition)
e. Coverage of deliveries in health facilities
f. Coverage of antenatal visits K4
g. Coverage of neonatal visits
h. Number of health workers trained in maternal and neonatal emergencies
i. Percentage of pregnant women with chronic energy deficiency (CED)
j. Percentage of babies aged < 6 months receiving exclusive breastfeeding
k. Percentage of toddlers whose growth and development are monitored
l. Number of toddlers receiving micronutrient supplementation
m. Percentage of districts/cities implementing nutritional surveillance

Meanwhile, the results of stakeholder interviews formulate KPIs based on primary health services such as Family Planning (KB), Pregnancy, Childbirth, and Immunization. Each service has various Key Performance Indicators (KPIs) that provide an overview of service performance as explained in **Table 1- Table 5**.

**Table 1.** Family Planning service KPI

| No | KPI | Target | Description |
|---|---|---|---|
| **1** | Monthly number of family planning patient visits | >=90 visits per month | Show the level of community participation in family planning services |
| **2** | Most frequently used types of contraception | Increase usage effective contraception that suits the mother's needs | Presents information about the most widely used types of contraception. |
| **3** | Distribution of the number and type of contraceptive use | >= 80 contraceptives used per month | Provides information on the comparative use of various types of contraception. |
| **4** | Comparison of new and old KB patients | New patient increase 5% per month | Showing new and existing patients the family planning services provided by midwives. |
| **5** | Comparison between patients with and without a history of miscarriage | Increaseaccess to appropriate family planning services for mothers with a history of miscarriage | Provides information about miscarriage history. |
| **6** | Age distribution of family planning patients | Achieving a balanced proportion of all age groups (70% age group | Creating an image visual about the age |

| | | | |
|---|---|---|---|
| | | 20-30 years, 2% age group under 20 years) | distribution of family planning patients. |

**Table 2**. Immunization Service KPI

| No. | KPI | Target | Description |
|---|---|---|---|
| **1** | Number of pediatric visits for immunization | Number of immunization visits >= 40 children per month | Demonstrates the level of participation of pediatric patients in immunization services. |
| **2** | Distribution of Use of Types of Immunization | Achieving the ideal proportion of immunization | Provide information regarding the use of types of immunization. |
| **3** | Distribution of Children's Weight by Age | Increase the proportion of children with normal weight based on age is 80% | Distribution of children's weight based on certain ages. |

**Table 3.** Pregnancy service KPI

| No. | KPI | Target | Description |
|---|---|---|---|
| **1** | Number of antenatal care visits | >= 20 visits per month | Demonstrates the level of patient participation in pregnancy health services. |
| **2** | Proportion of high-risk pregnancies detected early | Early detection of high risk pregnant women 80% | Shows the number and type of high risk maternal patient visits pregnant. |
| **3** | Age distribution of pregnant women | Achieving a balanced proportion of all age groups (less than 3% of the age group under 20 years and 30% of the age group over 35 years) | Provides an understanding of the distribution of the age of pregnant women within a certain range. |
| **4** | Distribution of body weigh and upper arm Length (LILA) | Increase mothers with normal LILA 90% | Providing information on nutritional indicators for pregnant women based on body weight and LILA. |
| **5** | Age grouping of primigravida dan multigravida women | Increasing the proportion primigravida at the age of 20-30 years (70%) | Show comparison between first time pregnant women (primigravida) and more from once (multigravida). |

**Table 4.** KPI of Maternity Services

| No. | KPI | Target | Description |
|---|---|---|---|
| **1** | Number of deliveries attended by midwives | Number of deliveries >= 3 per month | Demonstrate maternal participation in midwifery delivery services |
| **2** | Proportion of normal deliveries | Increase normal delivery 70% | Providing information on the number of mothers who gave birth at midwives |
| **3** | Rate of maternal referrals | LowerReferred labor (below 25%) | Provides information on the number of mothers referred to other facilities. |

| | | | |
|---|---|---|---|
| **4** | Gestational Age at Delivery | Increase the ideal gestational age to 37-40 weeks | Provides information on the mother's gestational age at the time of delivery. |
| **5** | Incidence of complications during childbirth | Reduce the number of complications during childbirth (below 5%) | Presenting data on complications that occur during normal or referred childbirth |
| **6** | Age Group of Mothers at Childbirth | Achieving a balanced proportion of all age groups (less than 3% of the age group under 20 years and 30% of the age group over 35 years) | Providing an understanding of childbirth in each maternal age group |
| **7** | Distribution of neonatal birth weight and body length | Increase the proportion of babies with normal BB and PB is up to 80% | Shows the distribution of weight and length of children born in midwife. |

### 3.2. Design Result

#### 1. Database Design

The database architecture shown at **Figure 3** will be used to store midwifery service data for presentation on the dashboard.

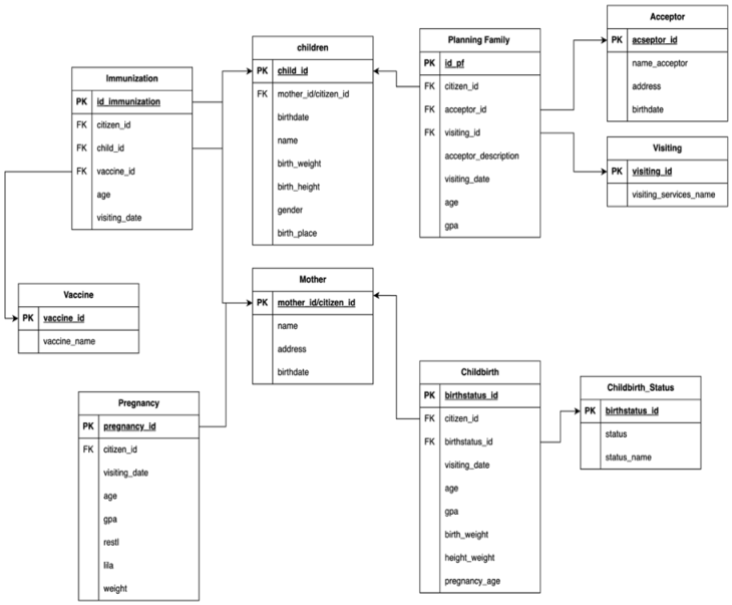


**Figure 3.** Database Relation Schema

#### 2. Dashboard Design Requirement

Based on the KPI that has been determined, the author has identified the design needs of the dashboard that will be displayed. The results of the identification of dashboard design needs can be found in **Table 5**.

**Table 5.** Dashboard Design Requirements

| No. | Information | Graphic Form |
|---|---|---|
| **1** | Distribution of birth weight and body length of babies | Scatter Chart |
| **2** | Comparison of the number of children (boys and girls) | Bar Chart |

| | | |
|---|---|---|
| **3** | Number of visits by KB mothers | *Single value chart* |
| **4** | Average age of KB mothers | *Single value chart* |
| **5** | Number of KB mothers | *Single value chart* |
| **6** | Most Contraceptives | *Single value chart* |
| **7** | Comparison of the number of recipients to acceptors | Bar Chart |
| **8** | Comparison of new and old visits | Donut Chart |
| **9** | Comparison of miscarriage history of KB mothers | Donut Chart |
| **10** | Age range of KB mothers | Donut Chart |
| **11** | Number of visits by pregnant women | *Single value chart* |
| **12** | Number of pregnant women | *Single value chart* |
| **13** | Average age of pregnant women | *Single value chart* |
| **14** | Comparison of pregnant women with high risk (resti) and those without, number and type of high risk pregnant women | Donut and Bar Charts |
| **15** | Age range of pregnant women | Donut Chart |
| **16** | Comparison of upper arm circumference of pregnant women per body weight | Scatter Chart |
| **17** | Comparison of first-time and multiple-time pregnancies | Bar Chart |
| **18** | Number of children's immunization visits | *Single value chart* |
| **19** | The most immunizations | *Single value chart* |
| **20** | Number of boys | *Single value chart* |
| **21** | Number of girls | *Single value chart* |
| **22** | Comparison of baby's birth place (hospital or PMB) | Donut chart |
| **23** | Comparison of immunization recipients | Bar Chart |
| **24** | Distribution of baby weight per age | Scatter Chart |
| **25** | Number of mothers giving birth | *Single value chart* |
| **26** | Average age of mothers at birth | *Single value chart* |
| **27** | Number of mothers referred | *Single value chart* |
| **28** | Average gestational age at delivery | *Single value chart* |
| **29** | Comparison of the number of mothers who gave birth and were referred, complications during childbirth | Donut and Bar Charts |
| **30** | Age range of mothers giving birth | Donut Chart |
| **31** | Distribution of birth weight and body length of babies | Scatter Chart |
| **32** | Comparison of the number of first and or more than one birth per age | Bar Chart |
| **33** | Total number of visits per year | *Single value chart* |
| **34** | Average visits per month | *Single value chart* |
| **35** | Most immunizations per year | *Single value chart* |
| **36** | Most contraceptives per year | *Single value chart* |
| **37** | Number of patient visits per service | Bar and Line Charts |
| **38** | Comparison of the number of patient visits per service per year | Donut Chart |
| **39** | Number of family planning service visits per month and ratio of acceptors per month | Line and Bar Charts |
| **40** | Comparison of the number of acceptors per year | Donut Chart |
| **41** | Number of pregnancy service visits per month | Line Graph |
| **42** | Number of maternity service visits per month, ratio of direct and referred deliveries | Line and Bar Charts |
| **43** | Comparison of the number of deliveries with midwives and those | Donut Chart |

| | |
|---|---|
| | referred |

With **Table 5**, the dashboard design can meet the information needs set by each KPI in an effective and easy-to-understand way for users. The dashboard design that has a drill down feature is as in **Table 6**.

**Table 6.** Dashboard Design For Drill Down Features

| No. | Information | Graphic Form |
|---|---|---|
| **1.** | Comparison of types and quantities acceptor receiver | Scatter Chart |
| **2.** | Details of the age range of KB mothers | Bar Chart |
| **3.** | Types and number of high risk mothers pregnant | *Single value chart* |
| **4.** | Details of the age range of pregnant women | *Single value chart* |
| **5.** | Type and number of complications during labor | *Single value chart* |
| **6.** | Details of the age range of mothers giving birth | *Single value chart* |
| **7.** | Details of the number and type of vaccines immunization | Bar Chart |
| **8.** | Number of family planning service visits per month and ratio of acceptors per month | Donut Chart |
| **9.** | Number of visits to maternity services per month and ratio of deliveries to referred deliveries | Donut Chart |
| **10** | Number of immunization service visits per month and comparison of immunization vaccines per month | Bar Graph |

### 3. Dashboard Layout Design

The interface design process is based on the needs that were identified in the previous step. For instance, **Figure 4** illustrates the design layout for the main dashboard page.

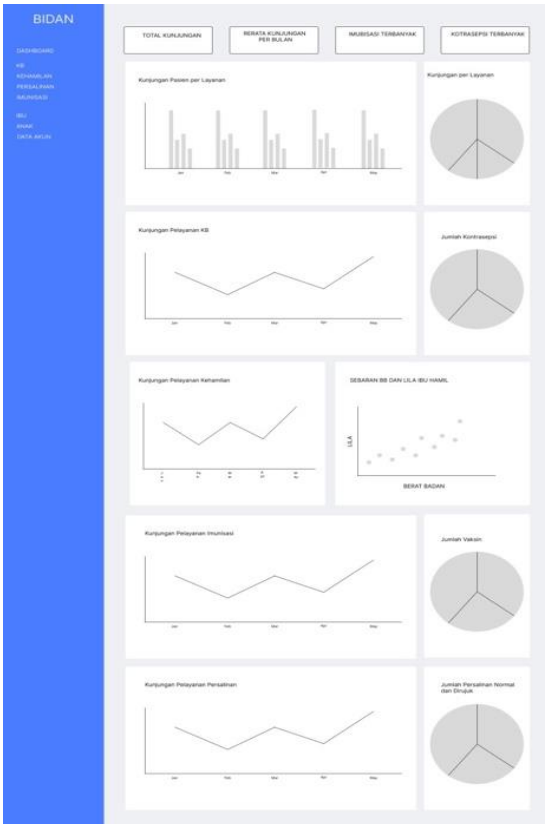

**Figure 4.** Main Dashboard Design

### 3.3 System dan Data Review

Based on the analysis of dashboard design demands conducted in the previous section, it is vital to select the data sources required to deliver the desired information. Data identification is required, as illustrated in **Table 7** below.

**Table 7.** List of Data for Dashboard

| No | Information | Data Requirements | Data Availability |
|---|---|---|---|
| **1** | Distribution of birth weight and body length of babies | Birth weight and birth length | **Available** |
| **2** | Comparison of the number of children (boys and girls) | Number of boys and girls | **Available** |
| **3** | Number of visits by KB mothers | Number of visits by KB mothers | **Available** |
| **4** | Average age of KB mothers | Age of KB mother | **Available** |
| **5** | Number of KB mothers | Number of KB mothers | **Available** |
| **6** | Most Contraceptives | Name of contraception and the largest number of contraception | **Available** |
| **7** | Comparison of the number of recipients to acceptors | Acceptor name, and number of acceptors | **Available** |
| **8** | Comparison of new and old visits | Visit name (new or old), number of visits | **Available** |
| **9** | Comparison of miscarriage history of KB mothers | GPA Data (Gravida Para Abortus) | **Available** |
| **10** | Age range of KB mothers | Age of KB Mother | **Available** |
| **11** | Number of visits by pregnant women | Number of visits by pregnant women | **Available** |
| **12** | Number of pregnant women | Number of pregnant women | **Available** |
| **13** | Average age of pregnant women | Age of pregnant mother | **Available** |
| **14** | Comparison of pregnant women with high risk (resti) and those without, number and type of high risk pregnant women | Total number of pregnant women, Number of pregnant women with high risk, type of high risk and number of high risk | **Available** |
| **15** | Age range of pregnant women | Age of pregnant mother | **Available** |
| **16** | Comparison of upper arm circumference of pregnant women per body weight | Weight of pregnant women and upper arm circumference of pregnant women | **Available** |
| **17** | Comparison of first-time and multiple-time pregnancies | GPA Data (Gravida Para Abortus) | **Available** |
| **18** | Number of children's immunization visits | Number of children's immunization visits | **Available** |
| **19** | The most immunizations | Name of immunization and the largest number of immunizations | **Available** |
| **20** | Number of boys | Number of boys immunized | **Available** |
| **21** | Number of girls | Number of girls immunized | **Available** |

| No | Information | Data Requirements | Data Availability |
|---|---|---|---|
| **22** | Comparison of birth places (hospital or PMB), comparison of boys and girls in hospitals and PMB | Number of children born in hospitals and PMB, number of boys and girls in each place of birth | **Available** |
| **23** | Comparison of immunization recipients | Name of immunization, number of immunizations | **Available** |
| **24** | Distribution of baby weight per age | Baby weight, baby age | **Available** |
| **25** | Number of mothers giving birth | Number of mothers giving birth at the midwife's | **Available** |
| **26** | Average age of mothers at birth | Age of mother at delivery | **Available** |
| **27** | Number of mothers referred | Number of mothers referred | **Available** |
| **28** | Average gestational age at delivery | Gestational age at delivery | **Available** |
| **29** | Comparison of the number of mothers who gave birth and were referred, complications during childbirth | Number of mothers who gave birth at the midwife and were referred, name of complications and number of complications during delivery | **Available** |
| **30** | Age range of mothers giving birth | Age of mother at delivery | **Available** |
| **31** | Distribution of birth weight and body length of babies | Weight and body length of babies born in midwives | **Available** |
| **32** | Comparison of the number of first and or more than one birth per age | GPA Data | **Available** |
| **33** | Total number of visits per year | Number of visits to the midwife | **Available** |
| **34** | Average visits per month | Number of visits to the midwife | **Available** |
| **35** | Most immunizations per year | Name of immunization, most immunizations | **Available** |
| **36** | Most contraceptives per year | Name of contraception. Most contraceptives | **Available** |
| **37** | Number of patient visits per service per month | Number of patient visits for family planning, pregnancy, childbirth and immunization services each month | **Available** |
| **38** | Comparison of the number of patient visits per service per year | Number of patient visits for family planning, pregnancy, childbirth and immunization services | **Available** |
| **39** | Number of family planning service visits per month and ratio of acceptors per month | Number of visits to family planning services, name of acceptor, and number of acceptors in that month | **Available** |
| **40** | Comparison of the number of acceptors per year | Acceptor name, number of acceptors | **Available** |
| **41** | Number of pregnancy service visits per month | Number of visits to pregnancy services | **Available** |
| **42** | Number of maternity service visits per month, | Number of visits to maternity services, number of deliveries at midwives and | **Available** |

| No | Information | Data Requirements | Data Availability |
|---|---|---|---|
| | ratio of direct and referred deliveries | referrals in the month | |
| **43** | Comparison of the number of deliveries with midwives and those referred | Number of deliveries at midwife and referred | Available |

## 4.4 Prototype Design

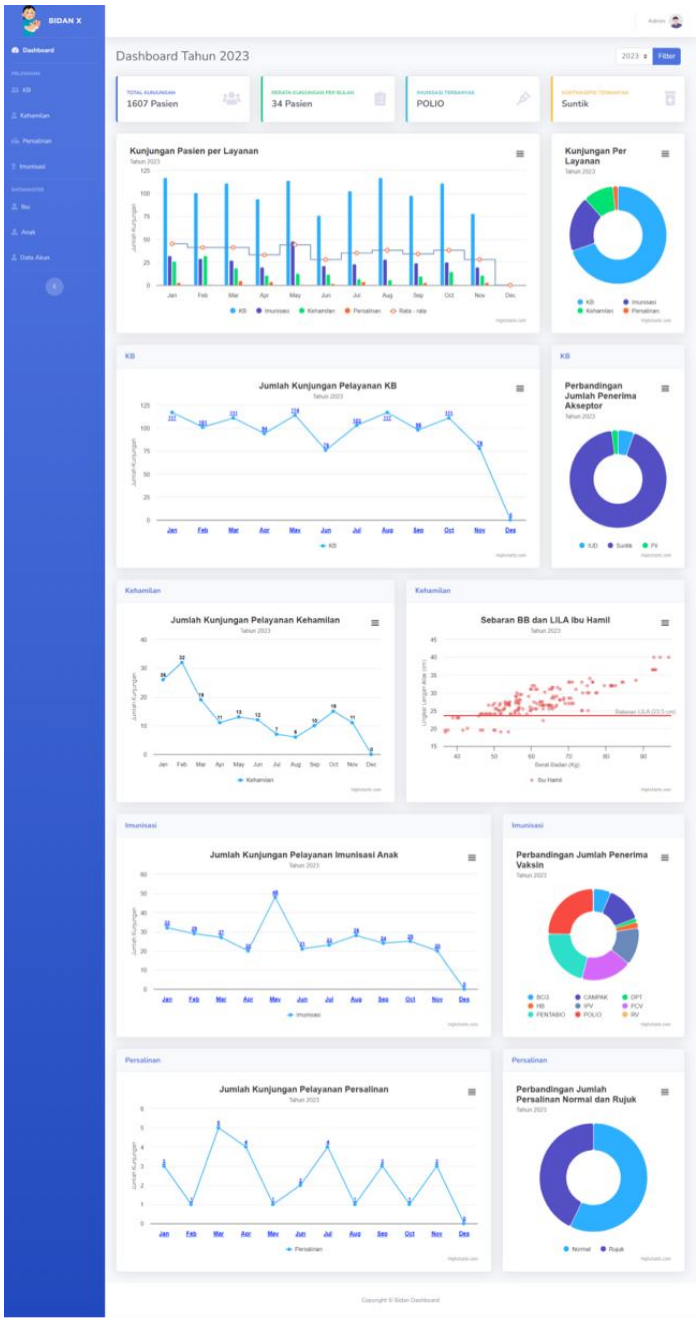


**Figure 5.** Main Dashboard of all services

**Figure 5** shows main dashboard page; this page is example result of prototype dashboard. Visual Studio Code, a programmer's tool, is used to create prototypes. Every feature proposed

for the interface design will be developed in the form of prototypes. The following are descriptions of the prototype outcomes for each service dashboard.

1. Prototype View of the Main Dashboard

The main dashboard prototype presents key midwifery service indicators using interactive drill-down visualizations. Line graphs enable users to explore trends and access detailed monthly data on family planning, immunizations, and deliveries, including types of services and referral cases. This functionality enhances data accessibility and supports real-time monitoring for informed decision-making. Visual examples are shown in **Figures 6 and 7**.

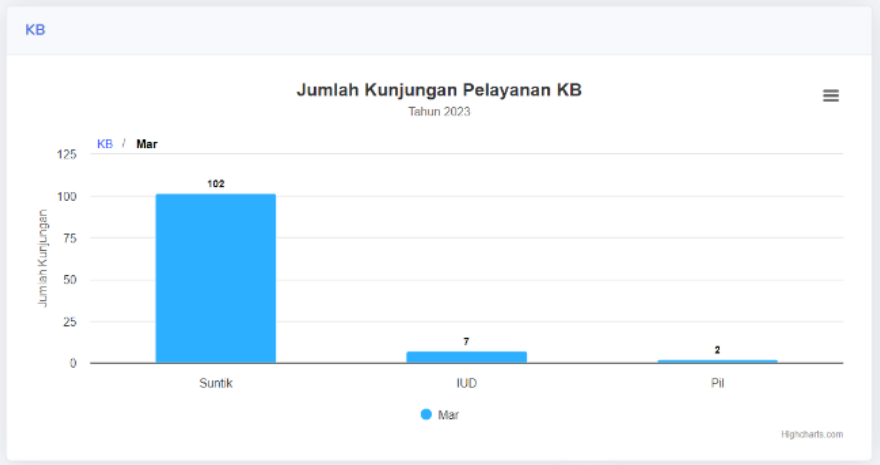


**Figure 6.** Drill Down Number of Family Planning Service Visits per Month

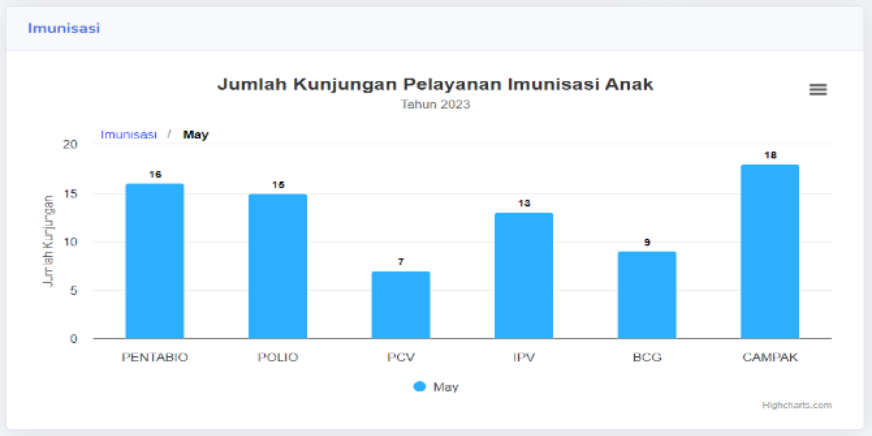


**Figure 7.** Drill Down Number of Immunization Service Visits per Month

2. Family Planning (KB) Service Prototype View

The prototype for the family planning service dashboard is illustrated in **Figure 8**. Each graph includes a title and a defined time span for the displayed data. Three types of visualizations are employed: bar charts, donut charts, and single-value indicators. Key metrics such as the number of visits, average age of patients, number of family planning participants, and the most used contraceptive methods are represented using single-value indicators. Contraceptive service data are displayed in a bar chart showing the type of contraceptive alongside the number of users. Donut charts are used to present comparative information, including visit distribution, miscarriage history, and patient age groups. The age distribution of patients is generally categorized by 10-year intervals. However, through the drill-down

functionality, users can access more granular data on the number of patients within narrower age ranges, as illustrated in **Figure 9**.

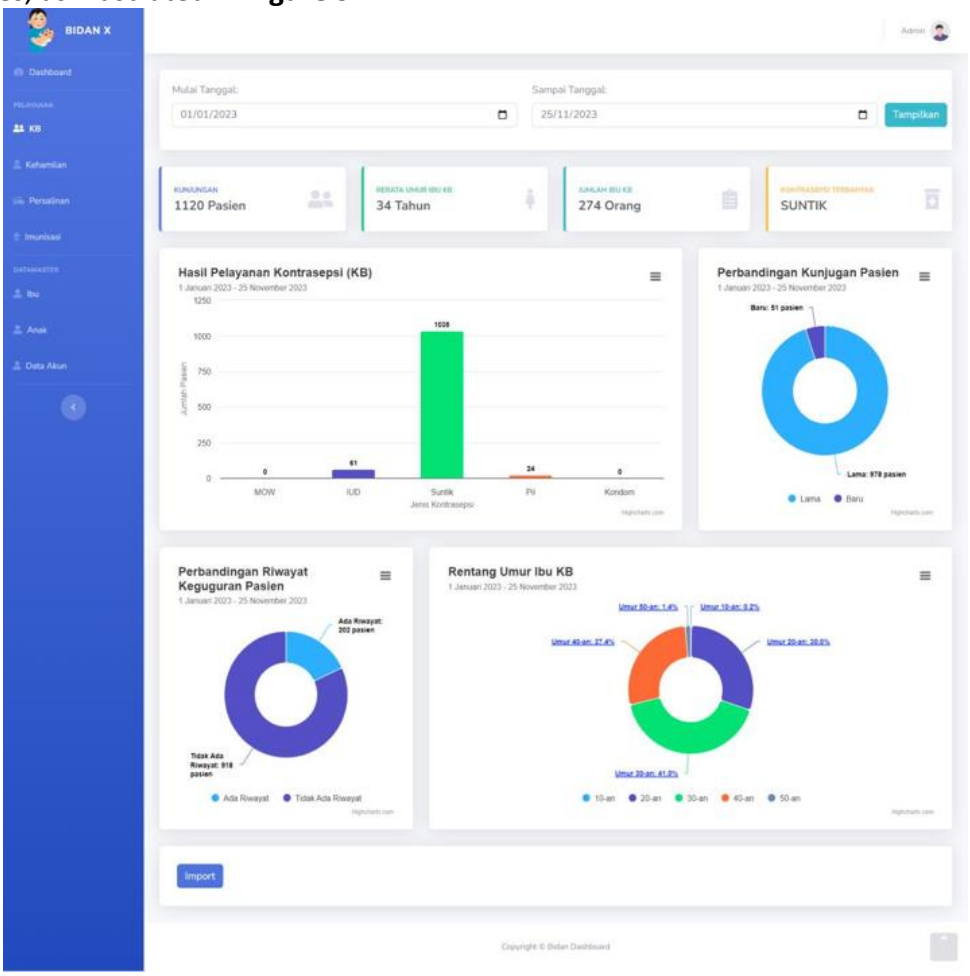


**Figure 8.** Dashboard of KB (Planing Family)

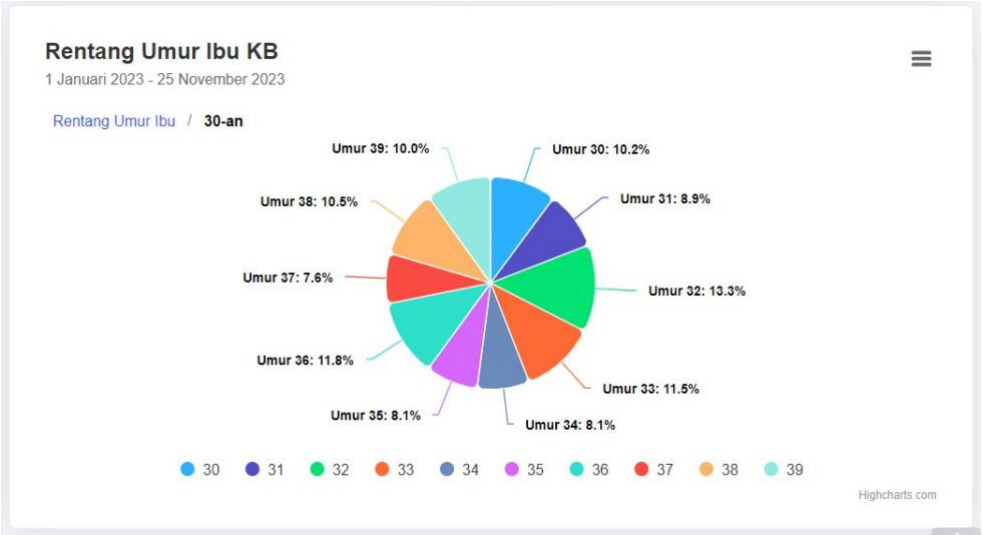


**Figure 9.** Prototype drill down Age Range

3. Pregnancy Service Prototype View

Pregnancy service information is presented using four types of visualizations: single-value charts, donut charts, bar charts, and scatter plots. Key indicators such as the number of visits, total number of pregnant women, and their average age are displayed using single-value charts. Comparative data, including the proportion of high-risk pregnancies and the age distribution of pregnant women, are represented using donut charts. A scatter plot illustrates the distribution of body weight and mid-upper arm circumference (MUAC), while a bar chart displays the distribution of first-time (primigravida) and multiparous (multigravida) women based on age groups. **Figure 10** presents the visual prototype of the pregnancy service dashboard.

The age range graph for family planning (KB) mothers provides detailed demographic data, as illustrated in **Figure 11**. Utilizing the drill-down functionality, users are able to access more granular information within the high-risk pregnancy graph, enabling a deeper analysis of risk factors, as shown in **Figure 12**. Additionally, based on user feedback, the visual representation of primigravida and multigravida data was revised to adopt a bar chart or pyramid bar chart format for improved clarity. **Figure 12** displays the updated version of these graphs.

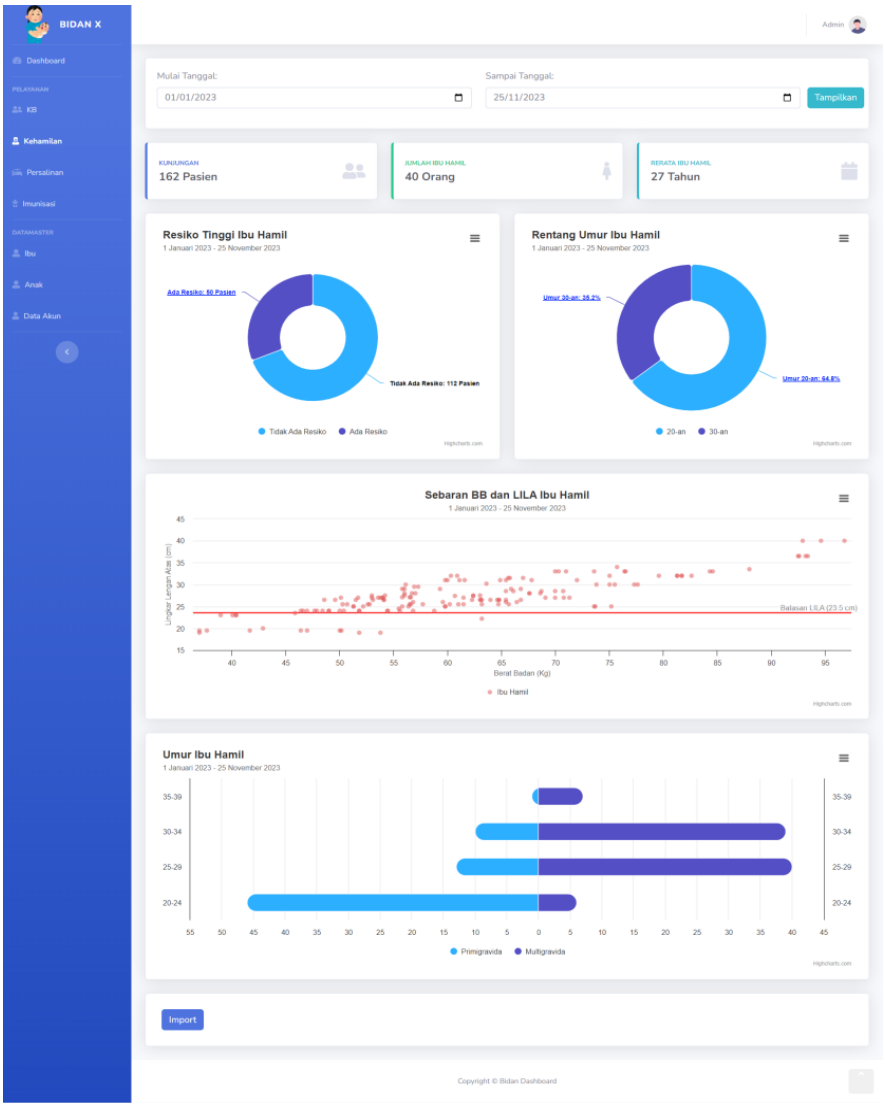


**Figure 10.** Dashboard Pregnancy Service

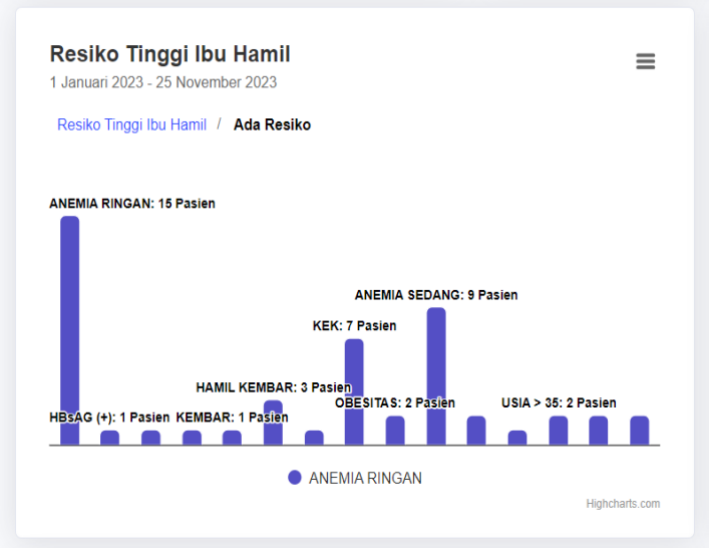


**Figure 11.** Drill Down High Risk Pregnant Women Image

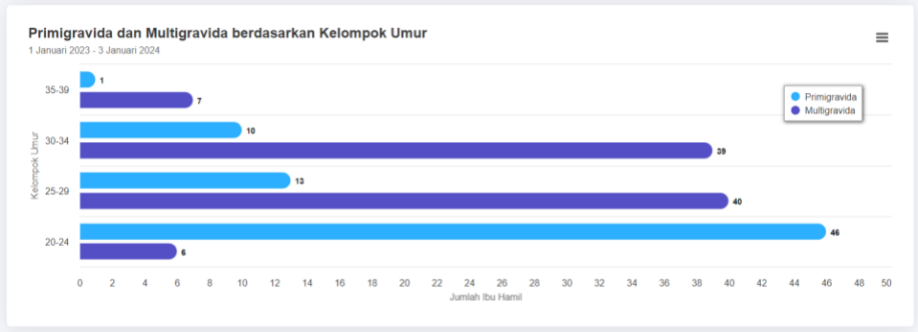


**Figure 12** Age grouping of primigravida dan multigravida women chart

4. Maternity Service Prototype View

Delivery service information is presented using five types of visualizations: single-value charts, donut charts, bar charts, and scatter plots. Single-value charts display key metrics such as the number of deliveries, the average age of mothers, the number of referrals, and the average gestational age at delivery. Bar charts are used to visualize the number of deliveries and the incidence of complications during childbirth. The age distribution of mothers at the time of delivery is illustrated through a donut chart. Additionally, scatter plots depict the distribution of birth weight and length, while bar charts provide data on primiparous and multiparous mothers categorized by age group.

The age range graph of delivering mothers allows users to access detailed demographic data, as illustrated in **Figure 9**. Both the delivery volume and complication graphs are enhanced with drill-down functionality, enabling users to examine specific details related to complications occurring during both midwife-assisted and referred deliveries. Further illustrations of these visualizations are provided in **Figures 13** and **Figure 14**.

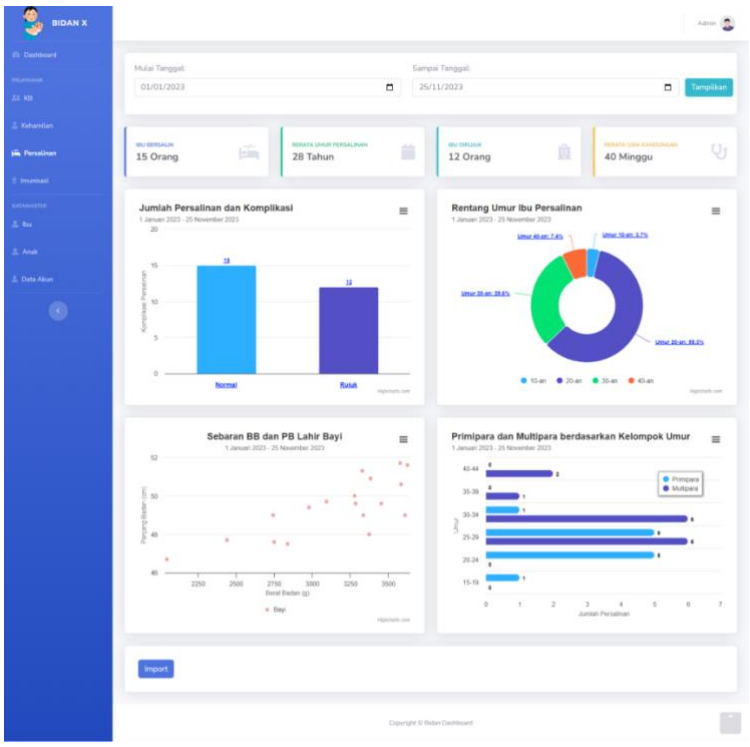


**Figure 13.** Maternity Service Dashboard


**Figure 14.** Drill Down Complications of Mothers During Normal Delivery

5. Immunization Service Prototype View

Maternity service information is presented using four types of graphical visualizations: single-value charts, donut charts, bar charts, and scatter plots. Key metrics such as the number of visits and the highest number of immunizations are displayed using single-value charts to emphasize critical data points. Bar charts are utilized to depict the number of immunizations administered, offering a clear view of distribution patterns. The place of birth of newborns is illustrated through a donut chart, providing insights into the proportion of different birth settings. Additionally, scatter plots are used to visualize the distribution of children's weight by age, enabling a comprehensive understanding of growth patterns.

Both the immunization count chart and the place-of-birth chart incorporate a drill-down feature, allowing users to explore more granular data. This functionality enables users to examine specific details such as the type and quantity of immunizations administered, as well as gender-based comparisons of birth locations, as illustrated in **Figures 15** and **Figure 16**.

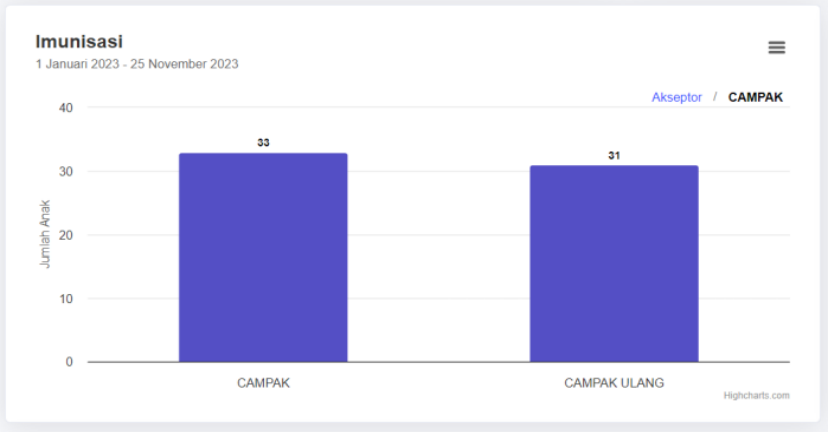


**Figure 15** Prototype Types of Immunization Vaccines

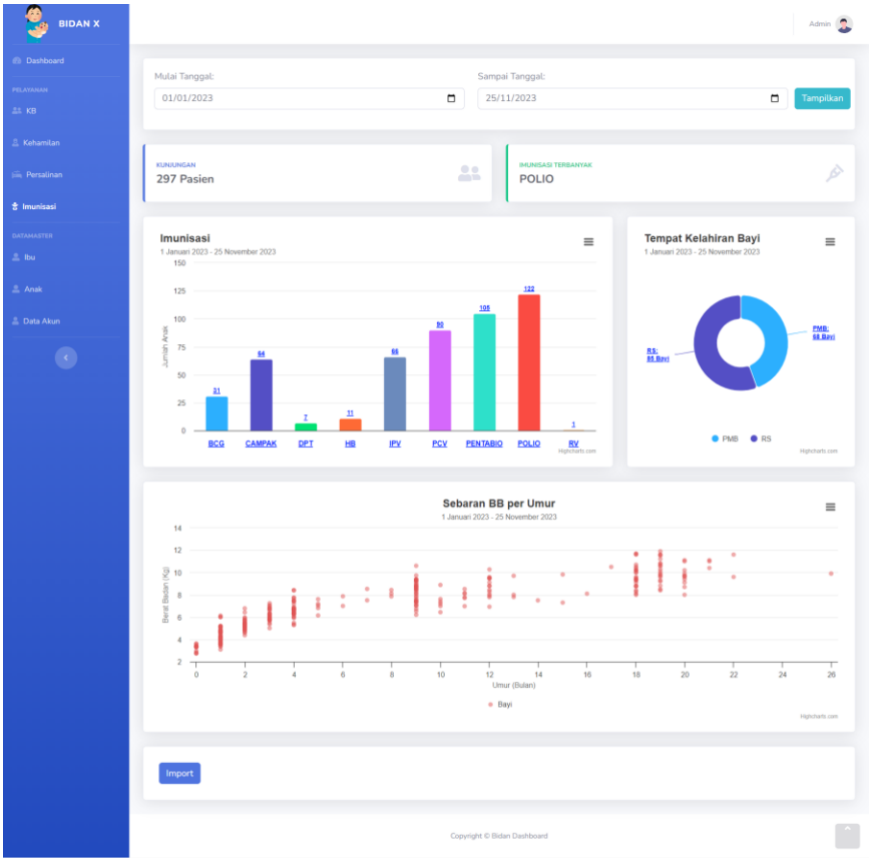


**Figure 16.** Immunization service prototype

The user wants to add information on the number of boys and girls who are immunized at the midwife. **Figure 17** shows the addition of a single-value chart of the number of boys and girls.

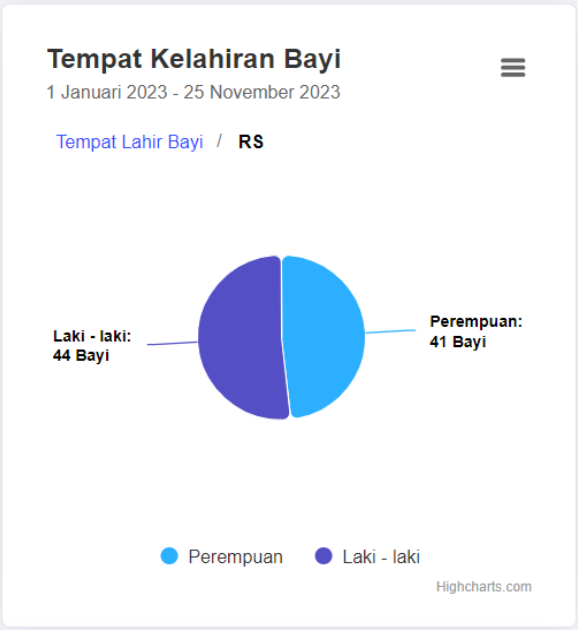


**Figure 17.** Drill Down number of babies by place birth

### 3.5 System Testing

Final testing is carried out to ensure that the application functions as it should. The testing carried out is black-box testing, which aims to evaluate overall functionality. The test results show that all system functionalities built is in accordance with user needs. **Table 8** presents an example of a black box testing result matrix on the main dashboard page.

**Tabel 8.** List of test scenario black-box testing

| No | Testing Scenario | Expected Result | ctual Result |
|---|---|---|---|
| 1 | User select dashboard menu | The dashboard menu displays the main data | The system displays the main data on the main dashboard and users can view the main data. |
| 2 | User choose filter menu | The data on the main dashboard menu changes to match the selected year filter. | The year filter on the dashboard menu works and users can view data based on the desired year. |
| 3 | Click drill down on the graph of visiting family planning service | Drill down graph of the number of family planning service visits displays family planning data for the selected month. | Users can view KB data based on the selected month. |
| 4 | Click drill down on the graph of visiting vactination service | Drill down graph of number of immunization visits displays data on the number of vaccines used in the selected month. | Users can view vaccine data based on the selected month. |
| 5 | Click drill down on the graph of number of maternity services | Drill down graph of number of maternity service visits shows the number of mothers giving birth and mothers referred in the selected month. | Users can view maternal data and refer to them based on the selected month |

## 4. CONCLUSION

The development of an executive dashboard system utilizing the Pureshare method has demonstrated its effectiveness in identifying and analyzing the critical components necessary for dashboard creation. This methodology enables the systematic integration of essential elements such as Key Performance Indicators (KPIs), appropriate graph types, and suitable dashboard formats. Based on the results of black-box testing conducted across various service modules—namely family planning, pregnancy, childbirth, and immunization—it can be concluded that the midwifery service dashboard meets the established testing criteria and performs effectively. The dashboard successfully presents data in a clear and functional manner, and its interactive features, including time filters and drill-down chart functionalities, allow users to access detailed data relevant to each service module. Although the current implementation is limited to midwifery service data from the West Java province, the drill-down approach has proven valuable for conducting in-depth data analysis and enhancing user understanding of data trends. Future research should focus on scaling the dashboard to incorporate broader datasets, such as midwifery service data at the national level across Indonesia, to further enhance its utility and impact.

## 5. ACKNOWLEDGMENT

This publication was made possible through the support of the Faculty Research Grant. We would like to express our sincere gratitude to the Faculty of Math and Science Education for providing the research funding that enabled the completion of this work. The financial assistance greatly contributed to the successful execution and finalization of this publication.

## 6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

## 7. REFERENCES

Baskett, L., LeRouge, C., & Tremblay, M. C. (2008). Using the dashboard technology properly. Health Prog. 89, 16–23 (2008). *Health Prog*, 16–28.

Bimaniar, I. M., Mawarni, A., Agushybana, F., & Dharmawan, Y. (2018). Pengaruh Persepsi Kemudahan Penggunaan Dan Persepsi Kemanfaatan Dengan Niat Untuk Menggunakan Sistem Informasi Manajemen Surveillance Kesehatan Ibu Dan Anak. *Jurnal Kesehatan Masyarakat (e-Journal)*, *6*(5), 209–215. https://doi.org/https://doi.org/10.14710/jkm.v6i5.22010

Fatoni. (2019). Kerangka Kerja Sistem Informasi Eksekutif Perguruan Tinggi. *Jurnal Teknologi Informasi Dan Ilmu Komputer*, *6*.

Ghazisaeidi, M., Safdari, R., Torabi, M., Mirzaee, M., Farzi, J., & Goodini, A. (2015). Development of Performance Dashboards in Healthcare Sector: Key Practical Issues. *Acta Informatica Medica*, *23*(5), 317. https://doi.org/10.5455/aim.2015.23.317-321

Gordon, J., & Richardson, E. (2013). Continuous Improvement in the Management of Hospital Wards: The Use of Operational Dashboards. Int. J. Manag. 30, 414–417 (2013). *International Journal of Management*.

Gumilang, S. F. S., & Sutari, W. (2018). Sebuah Usulan Generic Model Dashboard Aplikasi Kesehatan Pada Pemerintah Daerah Tingkat II di Indonesia. *Konferensi Nasional Sistem Informasi 2018*.

Kusnawi. (2011). Tinjauan Umum Metode Pendekatan Dashboard pada Proses Business Inteligence. *Data Manajemen Dan Teknologi Informasi*, *12*(2), 43–48.

Leod, M., Jr, R., Schell, & P, G. (2008). *Sistem Informasi Manajemen Edisi 10*. Penerbit Salemba Empat.

Martunus, M., Agushybana, F., & Nugraheni, S. A. (2019). Evaluasi Penerimaan Sistem Informasi Pelayanan Kesehatan Ibu Dengan Metode Tam Di Dinas Kesehatan Kabupaten Bungo. *Jurnal Manajemen Kesehatan Indonesia*, *7*(3), 212–216. https://doi.org/10.14710/jmki.7.3.2019.212-216

Maulana, S., Pudjiantoro, T. H., & Santikarama, I. (2018). Sistem Informasi Eksekutif Dinas Kesehatan Kabupaten Bandung Barat. *Prosiding SNST Ke-9 Tahun 2018*, *1*, 267–272.

Miftasari, C. A. (2011). Pengembangan Sistem Informasi Eksekutif Menggunakan Teknologi Web Service (Studi Kasus di Fakultas Saintek UIN Sunan Kalijaga). UIN Sunan Kalijaga.

Pestana, M., Pereira, R., & Moro, S. (2018). Pestana, M., Pereira, R., & Moro, S. (2018). A productivity dashboard for hospitals: an empirical study. In Information Systems: Research, Development, Applications, Education: 11th SIGSAND/PLAIS EuroSymposium 2018, Gdansk, Poland, September 20, 2018, Proceedings 11 (pp. 184-199). *Education: 11th SIGSAND/PLAIS EuroSymposium 2018, Gdansk, Poland, September 20, 2018*, 184–199.

Pestana, M., Pereira, R., & Moro, S. (2020). Improving Health Care Management in Hospitals Through a Productivity Dashboard. *Journal of Medical Systems*, *44*(4). https://doi.org/10.1007/s10916-020-01546-1

Prasetyawati, A. E. (2019). Kesehatan Ibu dan Anak (KIA) dalam Millenium Development Goals (MDGs). Nuhu Medika.

Pusat Kebijakan Kesehatan Global Dan Teknologi Kesehatan Badan Kebijakan Pembangunan Kesehatan Republik Indonesia. (2022). *Rencana Aksi Kegiatan Tahun 2022 - 2024 Pusat Kebijakan Kesehatan Global Dan Teknologi Kesehatan Badan Kebijakan Pembangunan Kesehatan Republik Indonesia*.

Ridwan Pranata. (2021). Pengembangan Dashboard Sistem Informasi Rumah Sakit dengan Metode Pureshare. *Universitas Islam Indonesia*. https://dspace.uii.ac.id/handle/123456789/34172

Sumihar, Y. P., & Wijaya, C. P. (n.d.). *Membangun Aplikasi Menggunakan Framework Kohana (Studi Kasus Puskesmas Kalasan)*. 44–54.

Sutisna, M., Rinaldi, A., Wijayanegara, H., Garna, H., Herawati, Y., Nurlatifah, T., & Cherawaty, A. (2024). The Practicality, Efficiency, Positive Impact and Effectiveness of the "Midwifery Manager" Management Information System in Improving the Quality of Midwifery Services at The Midwifery's Independent Practice Place Bandung. *Journal of Scientific Health*, 368–381. https://doi.org/10.56943/jsh.v3i3.610

Walker, D. S., Visger, J. M., & Levi, A. (2008). Midwifery Data Collection: Options and Opportunities. *Journal of Midwifery & Women's Health*, *53*(5), 421–429. https://doi.org/10.1016/j.jmwh.2008.04.002

Weiner, J. P. F. B. V. P. T. M. P. (2015). Integrating Strategic and Operational Decision-Making Using Data-Driven Dashboards: The Case of St. Joseph Mercy Oakland Hospital. *Journal of Healthcare Management, 60*(5), 319–330.

Yunus, W., Desanti, R. I., & Wella, W. (2020). Data Visualization and Sales Prediction of PD. Asia Agung (Ajinomoto). *International Journal of New Media Technology*.