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Design and Development of a Web-Based Neonatal Milk Management System

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Abstract: Human milk banks and neonatal care facilities handle information about milk donors, newborn recipients, hospitals, requests and the quantity of donor human milk available. When these records are maintained in paper-based registers or disconnected files, staff may need additional time to locate information, confirm availability and follow the progress of a request. This paper outlines the design of a proposed web-based Neonatal Milk Management System that brings these administrative activities into a common platform. Its planned functions include donor, recipient and hospital registration; user authentication; storage of relevant records; request review; generation of a unique request token; status monitoring; activity history; and an administrator dashboard. Donor and recipient profiles can contain information required by the institution, including age, blood group and relevant health details. Authorized hospital personnel can examine requests and record their progress. The proposed system is intended to improve the organization and retrieval of information and reduce reliance on manual records. This paper presents the system concept, its principal modules, workflow and anticipated benefits. The design has not yet been clinically validated or demonstrated in operational use. All donor screening, milk processing, storage, handling and distribution activities must continue to follow approved human milk bank and hospital procedures.

Keywords: Neonatal care, human milk bank, donor management, recipient management, web-based system, hospital information management, Token Based Authentication, Inventory Management.

1. INTRODUCTION

Newborns who receive care in neonatal units may need nutritional support beyond what is immediately available from their mothers. Where the mother's own milk cannot be provided in sufficient quantity, donor human milk may be considered through a suitably managed human milk bank. Coordinating this service requires the maintenance of donor and recipient details, hospital information, requests and related records. Staff need to access accurate information and maintain a clear history of actions.

A web-based information platform can give authorized users a shared environment in which to enter, view and update these records. The proposed Neonatal Milk Management System focuses on the administrative information work associated with donors, newborn recipients and hospitals. It is not designed to replace clinical assessment, laboratory procedures or the approved operating practices of a human milk bank.

2. PROBLEM STATEMENT

Donor and recipient information in some healthcare environments may be spread across physical registers, spreadsheets or separate applications. When records are held in different places, staff can find it challenging to retrieve a donor profile, review earlier requests, check recorded availability or coordinate work between hospitals and other authorized users. Repeated manual entry can also result in incomplete, duplicated or out-of-date records. A centralized information system is proposed to bring the relevant records together and provide a consistent way to follow requests.

3. AIM AND OBJECTIVES

The aim of this project is to design a web-based platform through which authorized hospital users can organize donor and newborn recipient details, hospital records, requests, availability information and related activities.

1. Enable online registration of donors, recipients and participating hospitals.
2. Keep donor and baby-related records in a shared database.
3. Record information such as age, blood group and relevant health history in accordance with approved institutional requirements.
4. Assign a unique identification number or token to each request that is accepted.
5. Allow authorized hospital personnel to examine requests and record changes in their status.
6. Make recorded availability information and earlier activity records easier to review.
7. Provide administrators with a dashboard for monitoring the records maintained by the system.
8. Reduce dependence on paper-based record keeping and support more efficient information retrieval.

4. LITERATURE SURVEY

Record-management practices in healthcare may involve paper registers, spreadsheet documents and hospital information applications. Although these methods can be used to store basic details, information distributed across several locations can be harder to search and coordinate. A shared database can provide a more unified view of records and the progress of requests.

Nguyen et al. reported the use of a locally developed, open-access digital monitoring platform for the human milk bank network in Vietnam. The platform covered areas such as donor administration, donor milk processing, recipient management and access to operational information. The study also discussed traceability, reporting and the use of collected data to support operational decisions [1]. This work illustrates how digital tools can contribute to the management of human milk bank activities. The system proposed in this paper is a

student project design with a more limited set of planned functions; it should not be regarded as a replica of the Vietnamese network platform.

The World Health Organization's publication on standards for donor human milk banking addresses key stages such as donor recruitment and screening, milk collection, storage, handling, processing, traceability, testing and quality assurance [2]. These standards-related areas should inform the design of any future information system intended to assist human milk bank operations. Accordingly, implementation would need to reflect applicable national rules and the approved procedures of each participating hospital.

5. PROPOSED SYSTEM ARCHITECTURE

The proposed architecture links separate registration and login functions to a central database. Donors, recipients and hospitals enter their details through the relevant interfaces. Authorized hospital staff or administrators then review the submitted information and handle requests. When a request is accepted, the application assigns a unique token or identification number. The database retains request details, status changes and associated activity history, while the administrator dashboard provides a summary of records and request progress.

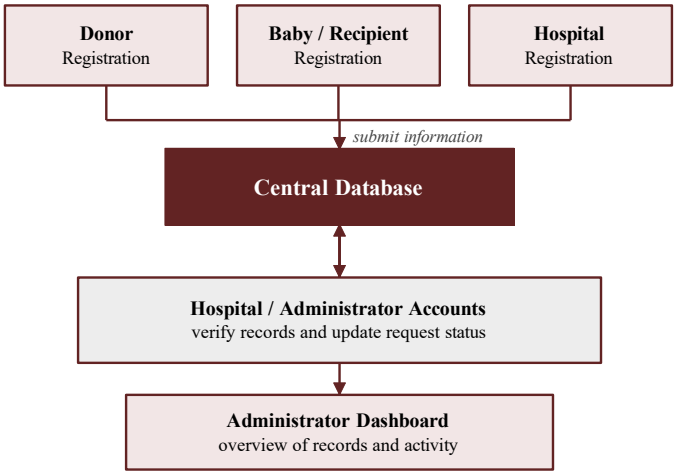


Fig-1: Proposed high-level architecture: donor registration, baby/recipient registration and hospital registration connect to a central database. Authorized users submit information, while hospital or administrator accounts verify records and update request status. The dashboard presents an overview of records and activity.

6. METHODOLOGY

The planned development work is divided into the following stages:

1. **Requirement identification:** determine the information and functions needed by donors, recipients, hospitals and administrators.
2. **Registration and authentication:** prepare registration forms and login access for the relevant user categories.
3. **Information entry:** collect donor, recipient and hospital details through the system interfaces and store them in the database.
4. **Record review:** provide authorized hospital staff or administrators with facilities to check submitted information.
5. **Request handling and token assignment:** save an accepted request and create a unique token or ID that can be used to identify it.
6. **Hospital-side updates:** enable authorized staff to record the current processing stage of a request.
7. **History maintenance:** retain status changes and previous activities so that they can be consulted later.
8. **Dashboard presentation:** show summary counts and request information, including donors, recipients, pending requests and completed requests.

7. MAJOR SYSTEM MODULES

Donor Module: This component stores donor registration information, for example name, age, blood group, contact details and relevant health information. Medical screening and decisions about donor eligibility must remain the responsibility of qualified personnel working under approved protocols.

Baby/Recipient Module: This component records information about the newborn recipient, including identifying details, age or age in months, the associated hospital and medical requirements entered by authorized staff.

Hospital Module: Hospital profiles are maintained through this component. Authorized hospital users can access relevant requests and enter updates about their processing status.

Token and Request Module: After a request has been accepted, this component creates a unique token or identification number. It helps users locate and track the request, but does not constitute clinical approval for the use or distribution of donor milk.

Administrator Dashboard: The dashboard is intended to summarize donor and recipient records, hospital information, recorded availability, pending and completed requests, and recent activity.

8. DATA MANAGEMENT, PRIVACY AND SAFETY CONSIDERATIONS

Because the platform may store personal details and health-related records, access should be governed by user roles. Each account should be able to view or change only the information needed for its assigned tasks. Implementation should consider secure authentication, appropriate password controls, encrypted data transmission, regular backups, audit records and defined data-retention practices. The institution must also address consent and the privacy rules that apply to the information it collects.

The proposed application is intended for information management; it must not independently determine donor eligibility, the safety of milk or the treatment required by a newborn. Decisions about donor screening, milk collection, handling, storage, pasteurization, microbiological testing, release and distribution must be made by qualified human milk bank and hospital personnel in accordance with current regulations and approved clinical procedures [2].

9. EXPECTED OUTCOMES AND ADVANTAGES

If developed and evaluated successfully, the platform is expected to provide one organized location for storing and retrieving donor, recipient and hospital information. A unique ID for each accepted request may make individual cases easier to identify and follow. The dashboard may help administrators see which requests are pending and which have been completed. Bringing records into a shared system may also reduce repeated data entry, improve consistency and support communication among authorized users. These points describe anticipated benefits; they are not measured outcomes from a deployed system.

10. LIMITATIONS

The present project description specifies the main registration, request, token, record and dashboard functions, but it does not report a completed deployment, user evaluation, performance testing or clinical validation. The software technologies, hosting model, links to existing hospital applications, detailed permissions and operational milk-bank workflow remain to be finalized during implementation. The usefulness of the platform will also depend on accurate data entry and consistent use by authorized personnel.

11. FUTURE SCOPE

Further versions could be extended with a mobile application, text-message or email alerts, online appointment and request features, updated availability information, QR-code tokens, location-based hospital search, expanded reporting and connections to existing hospital information systems. Additional traceability functions could be considered across the milk-bank workflow, provided that they comply with clinical and regulatory requirements. Stronger privacy mechanisms and a process for flagging urgent requests may also be explored.

12. CONCLUSION

This paper has presented the design of a web-based Neonatal Milk Management System for organizing information about donors, newborn recipients and hospitals. The proposed functions bring registration, record review, request tracking, token creation, status updates, activity history and an administrator dashboard into one platform. Such an arrangement is intended to make administrative information easier to maintain and retrieve. Before use in a healthcare setting, the system will require further development, security assessment and user testing, as well as alignment with the approved procedures and applicable requirements governing human milk banks.

13. CONFLICT OF INTEREST

The authors declare that they have no known conflict of interest related to this proposed student project.

14. ACKNOWLEDGEMENT

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REFERENCES

[1] T. T. Nguyen, H. T. Tran, K. T. N. Tran, O. T. X. Nguyen, A. T. T. Nguyen, and R. Mathisen, "Application of a locally developed open-access digital monitoring system for the human milk bank network in Vietnam," *International Breastfeeding Journal*, vol. 20, Art. no. 54, 2025, doi: 10.1186/s13006-025-00745-1.

[2] World Health Organization, *Standards for Donor Human Milk Banking*. Geneva, Switzerland: World Health Organization, Jul. 30, 2026. [Online]. Available: https://www.who.int/publications/i/item/9789240122307.

[3] S. Arslanoglu, W. Corpeleijn, G. Moro, *et al.*, ESPGHAN Committee on Nutrition, "Donor human milk for preterm infants: Current evidence and research directions," *Journal of Pediatric Gastroenterology and Nutrition*, vol. 57, no. 4, pp. 535–542, 2013, doi: 10.1097/MPG.0b013e3182a3af0a.

[4] N. Haiden and E. E. Ziegler, "Human milk banking," *Annals of Nutrition and Metabolism*, vol. 69, Suppl. 2, pp. 8–15, 2016, doi: 10.1159/000452821.

[5] S. Arslanoglu, E. Bertino, P. Tonetto, G. De Nisi, A. M. Ambruzzi, A. Biasini, C. Profeti, M. R. Spreghini, and G. E. Moro, "Guidelines for the establishment and operation of a donor human milk bank," *Journal of Maternal-Fetal & Neonatal Medicine*, vol. 23, Suppl. 2, pp. 1–20, 2010.

[6] K. Bharadva, S. Tiwari, S. Mishra, K. Mukhopadhyay, B. Yadav, R. K. Agarwal, and V. Kumar, "Human milk banking guidelines," *Indian Pediatrics*, vol. 51, no. 6, pp. 469–474, 2014, doi: 10.1007/s13312-014-0424-x.

[7] M. Quigley, N. D. Embleton, and W. McGuire, "Formula versus donor breast milk for feeding preterm or low birth weight infants," *Cochrane Database of Systematic Reviews*, no. 7, Art. no. CD002971, 2019, doi: 10.1002/14651858.CD002971.pub5.

[8] L. A. C. Muri, C. Caniçali Primo, M. B. Pontes, D. A. Silva, M. Fioresi, and E. F. Lima, "Development and evaluation of an app to manage human milk home collection," *Acta Paulista de Enfermagem*, vol. 35, Art. no. eAPE03161, 2022, doi: 10.37689/acta-ape/2022AO03161.

[9] J.-C. Picaud and R. Buffin, "Human milk—treatment and quality of banked human milk," *Clinics in Perinatology*, vol. 44, no. 1, pp. 95–119, 2017.

[10] C. Peila, G. E. Moro, E. Bertino, L. Cavallarin, M. Giribaldi, F. Giuliani, F. Cresi, and A. Coscia, "The effect of Holder pasteurization on nutrients and biologically-active components in donor human milk: A review," *Nutrients*, vol. 8, no. 8, Art. no. 477, 2016.