Original Research Paper

Neonatology

NEONATAL SMART PHONE APPS-ARE WE AWARE? : AN OBSERVATIONAL STUDY

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ABSTRACT

Objective: to identify various Smartphone apps available in the field of neonatology relevant for newborn care.

Methods: observational study was done over a period of 30 days. Search for apps was done in android phones using Play store and in IOS using Apple store. The apps were categorized according to their content and availability. Out of all apps 20 most relevant neonatal apps were separately tabulated.

Results: A total of 571 apps were retrieved. Some of the relevant topics covered were intensive care, resuscitation, drug doses, fluid calculator, jaundice, growth charts, immunization, blood gas analysis, sound decibels, ECHO, USG and apps for parents. Lesser number of apps were available in Apple store. Most of the apps were free of cost.

Conclusion: highly relevant neonatal apps are available which if used intelligently can facilitate newborn care including critical aspects like minimizing medication errors.

KEYWORDS : Mobile Apps, NICU, Newborn, Neonate

INTRODUCTION

Newborns are fragile and highly sensitive human beings. Their body physiology is different from those of adults; there buffering capacity is lesser than the adults thus making them prone to various errors especially the medication errors. Slightest of errors can cause serious responses in the newborns thus extra vigilance is required in them.In a review by Gray et al medication errors were reported as a common occurrence in NICU [1]. Providing evidence based treatment at the point of care is another important aspect of newborn care. Neonatal intensive care requires various practices for example proper hand washing, administrating drug in right dose, right interval and by right route, doing emergency procedures like providing resuscitation , putting long lines at correct site, analyzing blood gases and others. Simultaneously doctors also need to connect with the parents on long term basis. Parents also have lots of queries and apprehensions regarding proper care of their newborn. As mentioned by Bowman new mothers have lot of apprehension regarding various issues related to their baby like feeding, hiccups, danger signs, checking and reading baby's temperature, interpreting baby's crying signals, caring for baby's abdominal discomfort, understanding baby's growth and development, and dealing with choking and safety issues [2].But there is no readily available source for getting information regarding all these issues. It might not be feasible by health professionals to carry huge books all the time. Social media has been widely used for years by health professionals in an easily accessible, cost effective way to get scientific information and increase effective communication with general population. Various means like SMS, emails have been used in health services. Since last few years apps for smart phones are being developed as medium to give information to both health professionals and the common man. These apps can be used at the point of care for taking quick and correct decisions. However there is not much information in literature on the apps available in neonatology. Thus this observational study was conducted to answer the gap in knowledge of these apps and identify various apps available in the field of neonatology which provides relevant information for improving newborn care for both health professionals and parents of the newborns.

MATERIAL AND METHODS

It was an observational study done over a period of 30 days. Search for apps relevant to neonatology was done in android phones using Play store and in IOS using Apple store. Sample size was determined by the number of apps available. All the apps were retrieved with search words neonatology, newborn, neonate, NICU, hand washing, kangaroo mother care, sound meter/decibel, and arterial blood gas analysis. The apps were categorized according to their content and availability. Out of all apps 20 most relevant neonatal apps were separately tabulated. Consent was not required for the present study.

Ethical issues: None

RESULTS

A total of 571 apps were retrieved combined in two apps stores- Play store and Apple store& their details are shown in Table I, II &III with respect to their domain, payment profile & relevance respectively. Most of the apps were available in both Apple store & Google play; however, there were lesser number of apps available in Apple store. Most of the apps were available free of cost.

TABLE I: Distribution according to domain

Domain	Number
Intensive care	11
Books	16
Journals	6
Conferences	3
Blood gas analysis	49
Breast feeding	73
Jaundice	13
Growth charts	32
Calculator	21
ECHO and USG	10
KMC	1
Sound levels	102
Resuscitation	15
Scores	5
Hand washing	5
Parents	77
Vaccines	97
Miscellaneous	35

TABLE II: Distribution according to payment profile

Payment profile	Number
Paid	80
Free	491

TABLE III: 20 most relevant apps

Serial no.	App	Contents	Android/ IOS	Paid/ Free
1	Neomate	Multiple topics like NICU checklist, intubation, emergency drugs, central lines, cooling criteria, oxygenation index and others	Both	Free
2	AIIMS-WHO-CCENBC	Bedside newborn nursing	Both	Free

3	AIIMS-WHO CC STPs	Standard treatment protocols for management of sick newborns	Both	Free
4	NRP app	AAP/AHA guidelines for neonatal resuscitation	Both	Free
5	Ped Z	Percentiles, gestational age, hyperbilirubinemia, dosage, BP centiles and others	Both	Free
6	Billiapp	Jaundice charts based on NICE guidelines	Both	Free
7	Micomedex NeoFax Essentials	Drug doses	Both	29.99 $
8	Complete ABG	Blood gas analysis	Both	Free
9	Dextrose Calc	For calculating fluids with particular glucose infusion rates and concentrations	Both	Free
10	Hand hygiene training	Hand wash simulation	IOS	Rs.79
11	Neonatology illustrations	Digital textbook, pictorial representation of pathophysiology	Android	Free
12	Neonatology	NICU prescription	Both	Rs. 296.64
13	Pediatric scores	Compilation of scores like apgar, Silverman, new ballard score and scales like pain scale	Both	Free
14	Breastfeeding guide	Importance, technique, positions, problems	Both	Free
15	Tn ECHO	ECHO training	IOS	Free
16	Cranial ultrasound	Ultrasound	Android	Rs. 67.94
17	iVaccine-vaccine tracker	Region specific vaccine schedule	Android	Free
18	Sound meter	Displays sound decibels	Both	Free
19	Parentlane	Parent's guide to baby care	Both	Free
20	Neocare	Parent's guide to baby care	IOS	Variable

DISCUSSION

In the modern era where electronic gadgets are being increasingly used, use of apps can serve as effective, ready to use method to enhance knowledge of both health care professionals and parents of a newborn. Every parent doesn't have the privilege of having easy access to experienced and qualified doctors for their day to day queries. This leads them to follow the advices from society, family members and google which might not always be correct, sometimes even harmful for the newborns. Mobile messaging and emails have been used for bridging this gap. Recently use of smart phones and apps has widely increased. A editorial by Gupta G mentions that medical apps can be used as great facilitator to clinical medicine [3].In a recent study done in rural areas of GHANA a mobile Client Data App was designed as part of Mobile Technology for Community Health (MOTECH) program for maternal, neonatal, and child client data management by community health nurses (CHNs) [4].The feasibility, usability, and acceptability of this app was found to be good. A RCT done in 2016 showed that smart phone app can be used for increasing vaccine coverage in rural areas of China[5].Similarly app named mTika was used for increasing vaccination coverage in rural areas of Bangladesh and was found to be useful[6]. AIIMS, New Delhi had conducted a cross sectional study in 2013 regarding usage of "Apps in sick newborn care" and found an increase in knowledge and skills of health care professionals [7].In a 800 bedded medical centre in Taiwan a newborn baby care app was developed and tested in 64 mothers in postpartum ward. This app was found to be well perceived by the mothers under study [8]. In another review by Liu et al, feasibility and acceptability of a smartphone app for seizure care in children with epilepsy amongst care givers was observed. There was a favorable attitude of care givers towards use of these apps by the care givers [9]. Nguyen et al did a review on interventions to reduce medication errors in NICU and observed that use of technology based interventions (including computerized calculations) was found to cause maximum reduction in medication errors (73% reduction)[10]. Technology like

apps and podcasts are under exploration. In a recent review by Gupta, et al availability, utility and relevance of apps in obstetrics and gynecology were observed [11]. Mishra et al has mentioned about relevant podcasts available in the field of obstetrics and gynecology [12]. However there is paucity of literature on neonatal apps. This study provides extensive list of relevant apps in neonatology. Routine NICU practices for example hand washing, endotracheal intubation, central lines length measurement, intravenous fluid calculation , glucose infusion rate calculation, emergency drug doses, blood gas analysis sound levels are aptly covered in these apps. Along with intensive care common newborn issues like neonatal hyperbilirubinemia, vaccination, growth charts and breastfeeding are also described. Of the huge list 20 most relevant apps with their contents and ease of accessibility have also been mentioned separately. Most of the apps on books and journals are paid. There are some interesting simulation based interactive apps for handwashing, intubation, 2D ECHO which provides real time learning. Some of the apps have been developed in a parent friendly manner in common language to help them in their newborn care.

CONCLUSION

Appropriate use of neonatal apps has a promising potential to help doctors, nursing staff and parents. Our study reflects that some highly relevant easily available neonatal apps are available for management of newborns .Neonatologists might find these apps useful in getting assistance in day to day newborn care and better communication with their patients. It can also be helpful for nurses working in NICU, nurseries for improving care of newborns including the sick ones needing intensive care. Medication errors could be minimized at the point of care .Parents may also get benefitted by getting answers to queries on day to day care of their newborn. However these apps still need to be adequately exploited for improving newborn care especially in low resource areas. Further studies need to be done to establish the effect of use of apps in NICU for example reducing medication errors. More apps need to be developed for issues like developmentally supportive care, kangaroo mother care and nutrition.

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