

Data driven evidence-based wound care in developing countries: challenges, requirements and significance

Key words:

- Chronic wounds
- Incidence
- Prevalence
- Wound care data

Wounds are a serious public health issue and despite the large prevalence, crucial information such as prevalence rate, wound types, and treatment approaches are not properly documented. The lack of crucial wound care data significantly hampers the development of innovative technological solutions and formulation of effective healthcare policies. Some of the reasons for the lack of wound data are the absence of systematic data collection approaches, and inadequate funding. Collectively, these factors significantly reduce the amount and quality of available data on wound care, leading to poor treatment. Stakeholders are instrumental in determining the safety, efficacy, and cost of treatment. A proper wound database would help in policy making, optimising health planning, to alleviate patient suffering and also help to identify technological development trends. In addition, a seamless digital availability of relevant wound data can provide rapid access for all. The use of newer technologies, sophisticated tools, the establishment of a wound registry and the use of metadata can also contribute to better data collection.

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Chronic wounds are a silent epidemic and are considered a major public health problem with about 40 million people worldwide suffering at least once in their lifetime (Las Heras et al, 2020). In India, complex hard-to-heal wounds cause suffering to millions of people, representing a massively underserved patient population. Furthermore, this number is set to increase, putting a huge burden on the existing healthcare infrastructure and adversely affecting families and society as a whole. In today's rapidly evolving world, the need for wound care data has become crucial (Martinengo et al, 2019). Evidence-based healthcare solutions relating to wound care are primarily data-driven and require accurate data on the incidence and prevalence of wounds (Mostow et al, 2014.) A 2004 epidemiological study by Gupta et al reported that the prevalence of chronic wounds in India was 5.88 patients per 1000 people (Shukla et al, 2005). This study is nearly 20 years old, however no such epidemiological study was conducted in India in recent years, highlighting the lack of wound data (Gupta and Gupta, 2004). As the wound care data for developing countries has not been updated for almost 20 years, it is

redundant in the current situation and will mask the severity of the problem (Sen et al, 2009; India Advanced Wound Care Management Market, ND; Ty-De Guzman, 2017). Therefore, a dedicated wound database is essential to understand the complexity of this growing public health problem and will benefit the patients, clinicians, stakeholders and policymakers alike.

Lack of wound data in India: challenges and causes

In India, wound care is one of the most neglected fields (Paul-Satyaseela et al, 2013). According to a survey conducted in 2017, 70–80% of wound-related injuries were treated by nurses, with a 2020 study reporting 1.78 nurses per 1000 population (Maheshwari et al, 2021). Barriers to wound healing include lack of adequate funding from government, lack of quality products, inability to develop newer affordable wound care technologies and lack of standardisation (Corbett, 2012). Wound data in developing countries is complicated by the disparity among the existing data. In addition, the lack of concise and accurate wound care data at a single locations make it difficult for

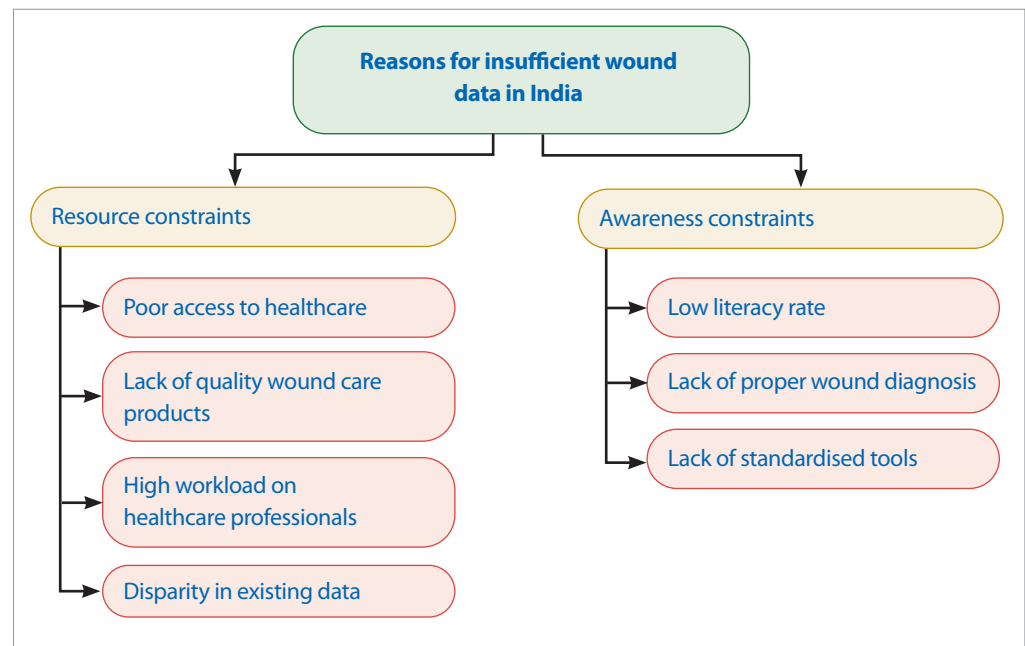


Figure 1. The reasons for the lack of wound care data in developing countries like India

researchers, clinicians and policymakers to analyse trends related to wounds, wound care and wound management. The lack of organised wound data makes it difficult to formulate new therapeutic strategies, supporting data are often scattered across technical documents making cause-and-effect analysis difficult to perform. In addition, many datasets are not searchable or downloadable, thus further complicating the issue (Urdea et al, 2006).

Another reason for non-availability of wound data is the variability in study design, data reporting and the measurement methods used. For example, the socio-economic condition practiced in developing countries is very different from those in developed countries. In developed countries, there is a standardized way to record the wound data. Therefore, developing countries require different strategies and approaches to overcome the same challenges. Many developing nations face a severe shortage of human resources and capacity, inadequate logistics, inability to pay the health workers, outdated infrastructure, unavailability of basic materials supplies and lack of electricity (Ryan, 1993). Unfortunately, people in India rely too much on home remedies and healing methods, which can result in the improper diagnosis of wounds and improper treatment, and as a consequence the wound becomes worse (Atkin, 2019). Moreover, Indian clinics and healthcare facilities lack all the diagnostic equipment under one-roof, as compared with the clinics and hospitals in developed countries (Flanagan, 2005).

Wound data: value and significance

The availability of wound data should prove to be the most significant tool in the fight against the complex hard-to-heal wounds. In order to provide more efficient and higher quality of wound data, healthcare professionals should provide data generated through hospitals, which can, in turn, led to the development of new medical technologies to aid wound healing (McDonald et al, 2020). Standardised wound data can help healthcare professionals assess the patients suffering from a hard-to-heal wounds, which can in turn provide early interventions and treatment to improve treatment outcomes and the quality of life among patients (Bolton et al, 2004). Standardised wound data can also help determine the need for improved understanding of the aetiology and types of wounds, as well as the factors that contribute to wound development and their importance to overall health and care (Gray et al, 2018). The availability of wound data may lead to improvements in diagnosis and treatment and also provide a source of information for further investigations and data creation (Jørgensen et al, 2013).

Data driven evidence-based wound care: need and necessity

Various data parameters can be recorded, such as the date of patient admission, wound type, frequency of dressing change, treatment costs, and date of discharge from hospital. To make the documentation of wound data easier and more effective, patient specific, clinicians

specific, stakeholders specific and policy maker specific data could be collected at source (Dealy 2008; Elliott, 2017; McDonald et al, 2020). When a patient develops a complex hard-to-heal wound a number of factors such as age, gender, comorbidities, body mass index (BMI), and length of hospital stay have to be considered at the time of data collection (Anusha et al, 2010). A valid dataset can provide new methods of assessing wound care patients and potentially help identify patients at risk (Frykberg et al, 2015). Moreover, advances in patient specific wound data reduce microbial infections, shorten hospital stay, improve patient's quality of life and also reduce patient suffering (Woo et al, 2008; Rickard et al, 2020).

It is important to record the patient's medical history, location and type of the wound, cause and stage of wound and other crucial parameters of wound assessment such as length, depth, width and pain level of the patient (Gupta et al, 2020; Oliveira et al, 2020). Another method of recording wound data can be ward monitoring where nurses monitor patients and record data such as wound photographs, signs and symptoms of infectious wounds, and report adverse events observed during the treatment process (Powers et al, 2016). Hospitals can also arrange follow-up meetings or telephone calls with health professionals at regular intervals to record the difficulties that patients are facing (Keast et al, 2004).

The key stakeholders in the healthcare industry are hospitals, patients, manufacturers, physicians, nurses, purchasers, insurance companies, pharmaceutical companies and government agencies, who are instrumental in determining the safety, efficacy and cost of treatment (Gillespie et al, 2015). Each stakeholder has certain duties to perform, for example: hospitals provide the resources for wound management; researchers prepare modules for various levels of wound care both at government and private hospitals; government can implement the regulations to enable easier and transparent availability of data and provide greater availability of grants for scholars working in wound management. Various other stakeholders such as manufacturers, industrialists and supply chain representatives help to determine the use of products, their niche supply and demand. With high-quality wound data, evidence-based decision making becomes easier and patient care becomes more effective (Eskes et al, 2012).

High-quality wound data that is specific to policy makers help in policy making, optimisation of health planning and resource allocation to improve the person's quality of life (Kitson et al, 1998). Policies need to be developed to ensure that the data are used to set policy priorities and solutions (Queen, 2010; Anderson et al, 2013). Adequate infrastructure is also needed for wound data collection using advanced technology. For example, increasing internet accessibility, and

Type of data needed for evidence-based wound care				
Patients	Healthcare providers	Govt. entities/ policy makers	Researchers	Industry
<ul style="list-style-type: none"> History Age Comorbidities Gender Ethnicity BMI Frequency of dressing change Treatment cost Patient satisfaction score Efforts to improve patient care 	<p>Clinicians/Nurses</p> <ul style="list-style-type: none"> Proper training Wound type Measurement technique Wound location Pain score Data on hospital discharge Wound evaluation and management Complaint handling and auditing Evidence-based training <p>Hospitals</p> <ul style="list-style-type: none"> Training on wound management Proper resource allocation 	<ul style="list-style-type: none"> Policy & regulations Provide grants to researchers working in wound care Incidence and prevalence of chronic wounds Decision making 	<ul style="list-style-type: none"> Gender-based wound care data Incidence and prevalence data Current thrust areas Recent treatment options Novel and affordable solutions Funding scenario 	<ul style="list-style-type: none"> Product development Product improvement Novel technologies Clinical evaluation Safety evaluation

Figure 2. The type of evidence based wound care data to be collected at different levels of wound care such as patients, clinicians, stakeholders, and policymakers

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regular training sessions for the used of novel wound care technologies.

There is a need to adopt new technologies and invest in data collection, analysis and dissemination. The COVID-19 pandemic greatly reduced the direct interaction between a patients with a hard-to-heal wound and wound care experts. The use of mobile and computer-based wound data collection technologies are a promising alternative to traditional wound data collection techniques. For example, smartphone based mobile applications were used to collect wound data during COVID-19 pandemic. The use of smart phone based mobile apps provides immediate access of wound data to medical health professionals in addition the use of mobile applications will prevent the loss of precious wound data (Agarwal et al, 2020).

Therefore, more consideration should be given to wound care data while formulating policies (Harding and Queen, 2010; Pacella et al, 2018).

Conclusion and perspectives

Wounds are currently subject to a vicious cycle of negligence. With the advent of technology, it has become the need of the hour to acknowledge the problem and integrate technology to develop better systems and programmes for the treatment of complex wounds (Li, 2006; Dumit, 2012). The existing information related to wound data is either not updated or is no longer relevant. Advancement in technologies should be used that are specific to the needs of wound management. These should be easily available, affordable to the public, easy to learn and easy to maintain. Data should be made available in digital form for quick access and a common database or portal can be established for storage. New technologies make it possible to overlay or merge different data sets to perform more sophisticated analysis (Li, 2006; Jordan et al 2018). There are a number of wound care apps that monitor patients with hard-to-heal wounds. These apps enable streamlined wound assessment that allows an interprofessional team to systematically view, analyse, and monitor the wound remotely (Jordan et al, 2018).

A census related to systematic analysis of wounds has also been required for a long time and needs to be addressed to improve the availability of information on wounds. A comprehensive data set with concrete and reliable information on the actual incidence of hard-to-heal wounds based on gender, age group, ethnicity and income level in India for better analysis of wounds

has become necessary in the present scenario (Hollander et al, 1995). Wound Care data can be collected from a wound registry. Proper and structured data from a wound registry can help the clinicians and wound care experts to evaluate and analyse the situation (Chen et al, 2010). Since accessibility to smart phones, the internet and adequate training is essential for wider accessibility of novel technologies, Governments and other stakeholders involved in policy making in low- and middle-income countries should consider that mobile phones, internet access and training sessions are an integral part of the overall policy formulation.

Metadata is necessary to improve wound prevention and management and easier access to metadata would allow researchers to identify the effect of the treatment provided to the patient (Nussbaum et al 2018). This may also help to identify the best and the most accurate methods to collect data, leading to high-quality data in wound care. National funding agencies need to support researchers, as do universities, provincial and territorial health authorities, and relevant professional bodies (Lowe et al, 2013; Munro, 2017). Data collection centres should also bring together patients with wounds, researchers, and stakeholders to provide better data and more effective interventions to change. WAS

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