

Challenges of Dental Material' Ordering at Governmental PHC clinics, Specialized Dental Centers, and Hospitals in KSA; Observational study

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ABSTRACT

Background: Ordering of dental materials (DM) at Ministry of Health (MOH) dental facilities is restricted by many challenges in time and supply among other factors

Methods: a questionnaire was distributed among dentists working at MOH dental facilities exploring the ordering way of DM and challenges if exist.

Result: 53.8% of dentists still use paper slip for ordering DM. Shortage is still a major obstacle as cited by 59.8% and it may take up to two weeks to receive the ordered DM

Conclusion: Atomization of DM ordering will save effort and time and enact efficient utilization of DM and reduce waste in expired or discarded materials.

Keyword: dental materials, ordering, supply, database.

Introduction

Dental care is offered free of charge for the Saudi population (1-4). The service includes preventive, restorative, and rehabilitative. Hence, dental care is a major burden on the Ministry of Health (MOH) budget (5). The dental materials' journey in Saudi MOH passes through three main stages. The first is the selection and acquisition of materials from different dental supply companies by the authorized committee members at MOH. The second involves materials

Supply and stock to the main and axillary dental storage for storing. The third stage involves ordering and distribution from stocks and to dentists. Throughout these stages, the pathway of materials is lengthy and complicated with obscure tracking and documentation. The usage of dental materials is strictly influenced by the physical and chemical characteristics of these materials as well as the time constraint of opening the material packages and the expiry date (6, 7).

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If the material is not used; either expired or distorted then both cases are discarded .Again, they are costly and if not used within their designated period to be used, they will be a waste on multiple levels; patients, dentists, and the Ministry of Health (MOH). Information technology via database systems is of paramount importance on multiple levels throughout the three stages mentioned. Establishing a database for dental materials is a cost-effective approach that would improve the efficiency and productivity of dental practice with health-economic value as a consequence (8.9). The MOH formulary is an efficient and effective example system that is in use currently. In this study we have investigated stage III; ordering and collection processes of dental materials within MOH dental facilities, from a dentist's perspective. Further investigations are needed for stage I and stage II of the usage of dental materials at MOH, KSA. The objectives of the study are to highlight obstacles dentists encounter regarding dental materials' current applied ordering mode, supply, time of delivery, availability, re-distribution, and disposal of expired ones.

Methods

Our target population is dentists who work at MOH dental facilities within the Kingdom. Pre-tested self-administered electronic questionnaires targeted dentists who work at MOH dental facilities all over the kingdom. According to the latest statistics, the number of dentists in KSA is 5653 distributed all over the Saudi geographic regions. The required sample size for this study at 95% CI with a precision of 5% and corrected for an estimated population of 5,653 dentists is 360. After adjusting for 10% non-response this study will target 396 dentists. Approval from IRB was obtained before the initiation of the study. The data was collected through an electronic questionnaire where participation is voluntary. No personal questions of name or location are included.

Results

In this study, 482 dentists from different MOH dental specialties and KSA regions answered the questionnaire. With a response rate exceeding a hundred percent. Around two thirds of the participating dentists were general practitioners (GPs), representing 71.8% of the total sample size. The presence of GPs was significantly higher in PHC units as compared to secondary care, 96% and 40% respectively. PHC has one or two dental clinics and does not have storage for dental materials but rather depends on frequent ordering according to needs. The materials path starts from dentist ordering, then delivery, and finally to its intended clinical destination

and usage. The mode of ordering is listing the materials in need and their codes on paper slips, then the request will be entered electronically and then submitted to the stock through the Mawarid portal. Mawarid (Arabic word for resources) specified MOH electronic resources platform for managing human and non-human resources at MOH. MOH has dental materials reference on PDF, where each dental material is designated with a name and a numeric code, and some of the DM supported with pictures. The entry of long numerical digit is prone to human error. Only 68.9% of dentists have or knew the dental supply reference for ordering the materials (figure1). 53.8% of dentists submitted their order through paper slip, and 26.6% through Mawarid directly (figure 2). It took one or two weeks as the time from ordering to receiving the materials as cited by 36.7% respondents, while others claimed it may delay up to a couple of months.

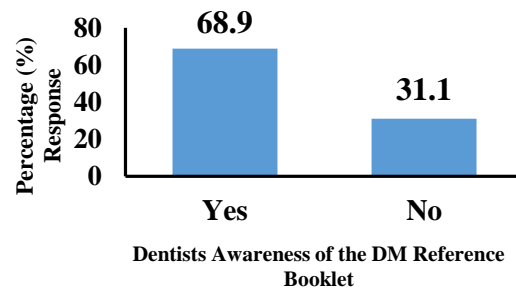


Figure 1: Dentist Awareness of the DM Reference Booklet.

Almost half of the dentists 49.4% were not satisfied with dental materials' clinical usage and attribute it to undersupply and fast expiry. The shortage of the DM is cited by 59.8% as the main obstacle in usage. Other obstacles cited are fast expiration of the materials (22.4%), the ordering process is lengthy (37%), delay in receiving the materials (46.9%), frequent receiving wrong orders (19.3%).

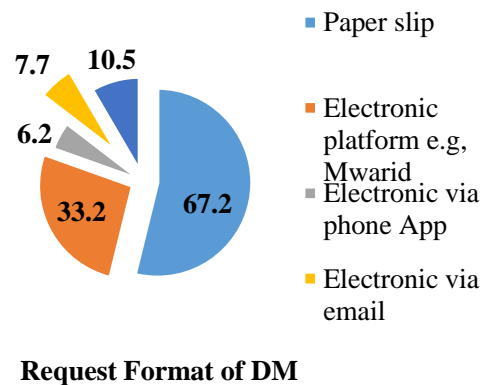
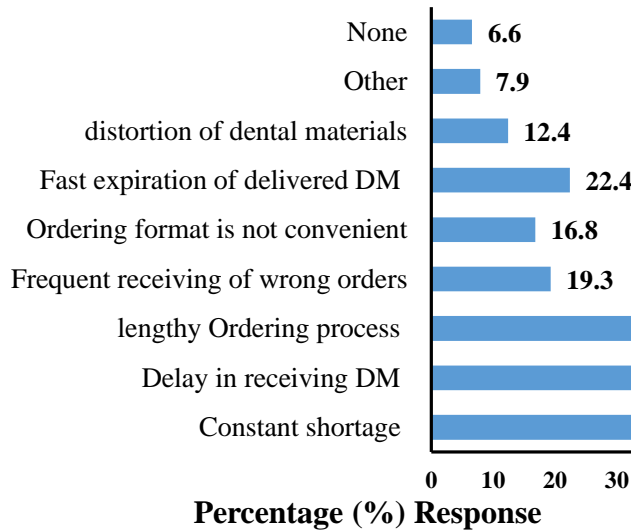


Figure 2: Request Format.

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Shortage in DM is not uncommon particularly in restorative materials, for example, dentists cited shortage by 52.3% in flowable composite, 51.7% in glass ionomer, 51% in composites, 49.4% in Dycal, and 36.5% in Gutta-percha points. 68% of the respondents indicated that the reason behind lacking the materials was that they were not available in-house (figure 3). In addition, dentists cited that Composite and Dycal are the most materials that expire before usage, (22%) and (21.7%) respectively.



Obstacles Encountered with DMs' Usability

Figure 3: Challenges Cited by Dentists.

The majority of dentists, 72.3%, agreed that the reason for material expiration is due to receiving them while they are about to expire. Only 42.4% of expired materials returned to the main stocks, and almost one-third of dentists 29.6% discard the materials in regular trashes, the rest of the respondent dentists do not know if there is a disposal protocol. The MOH had many electronic portals beside Mawarid in support of the unsatisfied dental clinic such as Musta'ed. Musta'ed (Arabic word for readiness) is to report the unavailability of (a dentist, materials, or dental assistant) on daily bases, which is run by the director of the facility. 35.5% of the respondents never heard of Musta'ed. Only 42.4% of expired materials returned to the main stocks, and almost one-third of dentists, 29.6% discard the materials in regular trash, the rest do not know if there is a disposal protocol (figure 4). For the GPs, the most materials that become in shortage are restorative materials such as composite, glass ionomer, and Gutta-percha points. Composite and Dycal are the most materials that are distorted

before usage, and this could be attributed to improper storing. While others cited receiving the materials when about to expire and thus expire before effective usage.

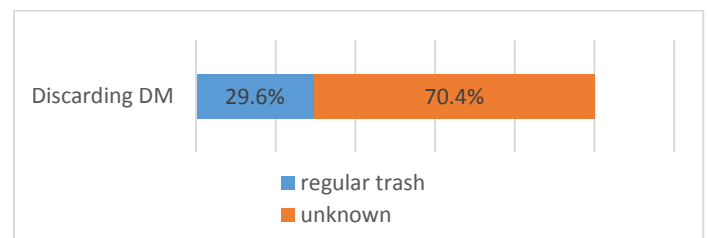
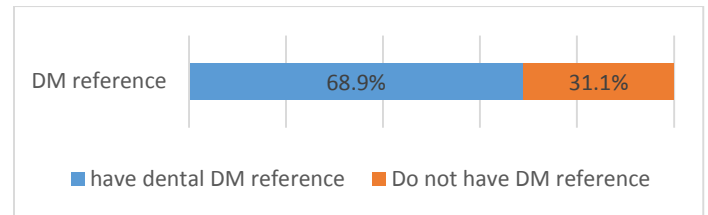
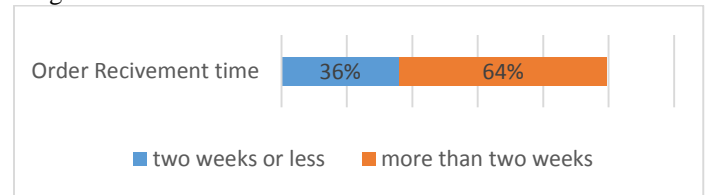


Figure 4: Dental Materials Logistics.

Discussion

Here are many challenges seen that affect the utilization of dental materials efficiently such as lengthy ordering process, delays in receiving the materials, frequent receiving wrong orders, undersupply, and fast expiration. The timing from the ordering to collection varies with no designation of a satisfactory time range that can be strictly followed. This unpredictability of unknowing when to receive the requested dental materials can be frustrating to the dentist and negatively affect the treatment plan and the services provided. The same applies to the request form, which is not unified as some dentists use paper while others Mawarid and some through the phone. The re-ordering is another issue when the assigned personnel do not enter the previous one electronically or enter the wrong codes. Again, the dentist does not have direct access or a clear path to reach the store personnel or storage. This process of ordering is complicated, subject to human errors, and inefficient with entering materials coding. It is not acceptable if almost half of the dentists were not satisfied regarding dental materials usage so plans should be initiated to correct the current challenges. There is no clear or applied protocol to re-order when any materials reach

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a clear minimum quantity. Hence, clinics at PHC should receive small quantities on frequent regular serving to maintain the balance between over and under-supply since PHC does not have storage. All the previous challenges and obstacles will be eliminated with a database that can define the materials, name, characteristics, date of acquisition and date of expiry, quantities, availability, and location. A platform where the user/ the dentist can access and search for the desired materials in the inventory and order the needed quantity is not a privilege but a necessity in today's business. Further advantages, database support data collection and statistical analysis that will be generated with simple clicks. Productivity in terms of the usage and the outcome of services provided can be calculated based on the generated data analysis and clinical procedures then efficiency quality measures can be extracted. Comparison and studies of the highly used and unused materials can help future decisions regarding the quantities of the materials to be purchased. An alarm system or ticketing would be helpful to be applied to maintain that balance so that if the materials reach the designated minimum quantity a ticket is issued for re-ordering and restocking the inventory as well. Hereafter, the database with DM picture will eliminate the ordering errors of the materials. Oversupply is another issue when the exact amount that is needed cannot be estimated, thus the supply is larger than the demand. The destination of material is either in the storage if expired or in the clinic either used or expired. After that no monitoring or documentation and how their used with no productive statistical analysis and no economic evaluations. Utilization of dental materials within the designated period, before the expiry date is crucial to sustain cost-effectiveness. Thus, defining a time range from order to delivery can be seen and tracked in the databases. At current, dentists at MOH dental facilities have no direct access to stored dental materials such as the type of fillings available, their quantities, shelf time, the annually updated lists of the materials, and the newly added items. If the dental materials database was implemented, all information would be available on the database board and dentists may easily access it. Such information could be beneficial in the strategic planning of required treatment. In addition, nowadays with the huge advancement in technology and digital networks, the development of dynamic databases is feasible and even a necessity. At Saudi MOH, no electronic database was implemented yet for dental materials. Lastly, no single study has been conducted to assess the usage and challenges of dental materials (supply, distribution, ordering) in Saudi Arabia. Ultimately, the database will eliminate unnecessary massive quantities on stock shelves or clinic drawers.

In addition, it will maximize efficiency and minimize the waste of time and money in the clinics.

Conclusion

Databases will reduce unused materials and eliminate untoward lacking materials or over-supply through redistribution and supply according to needs measures. This study strongly recommends the creation of an automated electronic database that can be used by all involved personnel from the stock personnel to the dentists' end users. Ultimately, to maximize dental materials usability, efficiency, fair distribution, productivity, cost control, time limitation, and waste restriction. Establishing a database for dental materials is fundamentally aligned with the 2030 vision objectives in the kingdom. With a database system, it is possible to process materials' transaction process in real-time and location, monitor the process from the time of acquisition of the materials to the time of distribution and usage eventually by the dental personnel.

Conflict of Interest

None

Funding

None

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