

SUMMARY.

This study was conducted in Hambantota district to test the effectiveness of the use of a new restorative material - Glass Ionomer Cement (GIC), in Out-reach dental clinics, in relation to existing restorative materials (Amalgam).

Four indicators were used to assess the effectiveness of GIC. These are, efficiency of GIC over Amalgam, its cost effectiveness, the estimation of logistic difficulties with regard to the introduction of GIC into out-reach dental clinics, and the estimation whether GIC is able to fulfill the School Dental Therapist's (SDTT) expectation as a new restorative material.

The efficiency of GIC was estimated by the comparison of work outputs of out-reach clinics, which were conducted using GIC and Amalgam. In addition, the quality, the durability and the occurrence of post operative complications of GIC and Amalgam restorations were also considered to assess the efficiency of GIC. The quality of restorations was measured by using the WHO quality assessment criteria. The durability was estimated according to the deterioration of the quality and the dislodgment of restorations.

The cost effectiveness of the use of GIC was calculated by comparing the cost for a GIC and an Amalgam restoration with the respective percentages of durability of these restorations.

SDTT's perceived characteristics of a new restorative material were compared with the properties of GIC to assess the fulfillment of their expectations.

Availability of existing facilities and the requirement of additional resources were considered to find out logistic difficulties for the introduction of GIC into out-reach dental clinics.

Comparative study design was used to test the effectiveness of GIC in out-reach dental clinics. One group of children was treated with GIC and another group of children was treated with Amalgam. Those treated children were followed up for a period of six months. Re-examinations were made in one, three, and six month intervals. In addition, a postal questionnaire was used to obtain the ideas of SDTT regarding the characteristics of a new restorative material.

Three SDTT from Hambantota district were randomly selected according to their service experience for the training for GIC restorative technique. Following the training, these three SDTT were advised to conduct three out-reach clinics in three randomly selected schools. Children in one school were treated with GIC while Amalgam was used to treat the children in other two schools. This allocation was also a random selection.

The severity and the prevalence of dental caries in GIC and Amalgam groups did not show any significant difference ($p > 0.05$). Except for the sex of the children, the distribution of other confounding factors, (namely, the age, type of dentition, type of tooth, type of restoration, service experience of the SDTT) in the two groups, also did not show any significant differences ($p > 0.05$).

Total number of 430 children was examined in both groups. Out of them, 205 children were examined in the GIC group. SDTT placed 175 GIC restorations and 19 Fissure Sealants on 88 of those examined children. The rate of treatment was 8.1 restoration per SDT per hour, and on average 2.0 GIC restorations were placed on a child.

In the Amalgam group, 225 children were examined and 88 of them were treated. Total number of 141 restorations was placed on them with the rate of treatment of 5.5 children per SDT per hour. In this group, on average a child received 1.6 Amalgam restorations.

In both groups, SDTT were able to place restorations with similar in quality, and without causing post-operative complications. However, the durability of restorations was significantly affected ($p < 0.05$) according to the service experience of the operators and the type of restorations (namely, single surface and multi-surface restorations). But, these effects were similar to both GIC and Amalgam restorations ($p > 0.05$).

The durability percentages of GIC restorations for one, three and six month intervals were 97.1%, 87.9%, and 84.9% respectively. The corresponding figures for Amalgam restorations were 97.1%, 89.2%, and 84.7% respectively for the same period. These durability percentages did not show any significant differences ($p > 0.05$).

According to the above results it was evident that, with the use of GIC in out-reach dental clinics, SDTT were able to place more restorations in children, and also they were able to treat these children in relatively short period of time. As a result, with the use of GIC, SDTT were able to produce higher work output in out-reach dental clinics. Therefore, GIC appeared to be a more efficient restorative material than Amalgam in terms of provision of restorative care.

Cost for an Amalgam restoration was Rs. 22.37, in contrast to the requirement of 21.47 rupees for a GIC restoration. According to the cost for a restoration and the percentage of durability of restorations for six months, the cost effectiveness ratio of 0.253 for GIC was better than the corresponding figure of 0.264 for Amalgam.

The training of SDTT for GIC did not require any special educational materials or equipment and the training was completed within 4 hours. Further, training programme was conducted by an ordinary dentist, and no restorative specialist was employed. Moreover, the placement of GIC restorations did not require any additional resources. Thus, the introduction of GIC to out-reach dental clinics do not seem to have any logistic difficulties.

All SDTT indicated that the necessity of a new restorative material for out-reach dental clinics. According to their responses regarding the perceived characteristics of the new restorative material, 58% of responses were stated that the new material should be easy to manipulate while 20% stated that it should have the similar colour as teeth. As these characteristics are similar to the qualities of GIC, it seems to be fulfilling the SDTT's expectation as a new restorative material.

Since the use of GIC is more cost effective than Amalgam, and the training of SDTT for GIC restorative technique does not need any additional resources, introduction of GIC into out-reach dental clinics would be a substantial saving to the government in terms of money, material, and manpower. Further, due to the fulfillment of SDTT's expectations as a new restorative material, GIC would be well accepted by SDTT. Therefore, the introduction of GIC into out-reach clinics would be more effective way of provision of restorative care.

As out-reach clinics are conducted with limited facilities compared to school dental clinics, similar results could also be observed if GIC is introduced to school dental clinics. Thus, the introduction of GIC for School Dental Service in Sri Lanka is a reasonable solution to overcome the low work out put of the School Dental Service. Therefore, the use of GIC in School Dental Service will be a better strategy to overcome the problem of untreated dental caries in the Sri Lankan children.