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Schülke Preventive Program for intrahospital Clostridium difficile infection

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Aims: The aim of the study was to compare the efficacy of Schülke Preventive program for Health Care Facility Associated Cl.difficile infection (HCFA CDI) implemented in 2014 to standard protocols in 2013 (the incidence, clinical features and cost benefit analysis).

Methods: The study was conducted in the seven Clinics of the Clinical Center of Vojvodina, Serbia. Schülke Prevention Program included education, motivational measures and complete hygiene program while standard protocol was based on different products and bleach. Monitoring the hygiene was done by spot checks by The Hygicult TPC. The infection had been confirmed by two steps serology test. We obtained the incidence of infection and relevant clinical features of patients. For cost benefit analysis for each patient with HCFA CDI we randomly selected four controls, with the same diagnosis but without CDI. Financial reports on the total cost of treatment and all its compounds were obtained.

Results:

The incidence dropped (16,34 to 6,07/10 000 bed days / annually 49,01 in 2013 to 18,22 in 2014).

Table 1. The incidence of HCFA CDI in study period

No	The Clinic	2013			2014 schülke +		
			incidence /10.000 b.d.	Estimated annually incidence /10.000 b.d.		incidence /10.000 b.d.	Estimated annually incidence /10.000 b.d.
1	NEPHROLOGY AND CLINICAL IMMUNOLOGY	15	27,21	81,63	5	7,84	23,53
2	ENDOCRINOLOGY	4	7,93	23,78	2	3,79	11,38
3	GASTROENTEROLOGY	9	15,29	45,88	4	6,23	18,69
4	CLINIC FOR HEMATOLOGY	14	30,26	90,79	7	13,05	39,14
5	UROLOGY	5	11,00	33,01	3	6,62	19,87
6	ABDOMINAL SURGERY	16	30,37	91,12	1	1,84	5,51
7	INFECTIOUS DISEASES	0	0,00	0,00	3	3,87	11,61
8	ENDOSCOPIC ROOM	/	/	/	/	/	/
9	DPT. FOR DIALYSIS	/	/	/	/	/	/
10	SUMMARY	63	16,34	49,02	25	6,07	18,22

The number of CDI cases was drastically reduced on Clinics in which the program was carried out under the rules of hygiene ($r = -0,786$ $p = 0,064$).

Table 2. Results of hygiene monitoring (Hygicult TPC) during the study

Clinic	Σ CFU*	% of incidence fall
Nephrology	30	71
Endocrinology	84	52
Gastroenterology	166	59
Haematology	128	57
Urology	216	40
Abdominal surgery	38	94

* Σ CFU – Colony Forming Units

The patients with HCFA CDI stay significantly longer in hospital than their matched controls ($p = 0.000$ and $F = 69,379$) prolonging the hospitalization for 14,52 days. HCFA CDI significantly increases the total cost of hospitalization as well as each element of the price with additional cost of 1142€ (with age as covariate 1397€).

Table 3. Cost benefit analysis of the study

		N	mean	Est. marginal mean	SD	SE	95% Conf. int. for mean		min	max	F	p	Partial Eta Square	Welch
							Lower Bound	Upper bound						
Age	patients	86	62,93	-	13,09	1,45	60,03	65,82	22	87	5.410	0.021	-	0.009
	controls	327	58,42	-	16,16	0,89	56,66	60,18	18	91				
Hosp. days	patients	86	27,99	28,54	22,32	2,43	23,14	32,83	4	97	46.382	0.000	0.108	0,000
	controls	327	15,01	14,91	13,32	0,73	13,56	16,46		100				
Total price	patients	86	2406	2633	3788	408	1594	3218	0	22462	24.855	0.000	0.058	0.008
	controls	327	1264	1236	1695	94	1079	1448	0	15820				
Bad day costs	patients	86	935	986	2319	253	432	1439	0	20875	16.729	0.000	0.040	0.043
	controls	327	412	404	526	29	355	470	40	4371				
Service costs	patients	86	704	730	630	69	567	840	0	3276	15.751	0.000	0.037	0.003
	controls	327	478	473	493	27	424	532	9	4927				
Meds& Blood prod. costs	patients	86	1102	1222	2645	285	534	1669	0	17948	22.957	0.000	0.054	0.017
	controls	339	398	383	840	46	306	489	0	7964				
Material costs	patients	86	144	149	205	22	99	188	0	1086	10.890	0.001	0.026	0.011
	controls	327	81	81	151	8	65	98	0	1099				

Cost benefit analysis of Schülke Preventive Program in 2014 has been calculated using formula:

((No. of HCFA CDI cases in 2013 – No. of HCFACDI cases in 2014) x Mean difference in treatment cost per CDI patient) - Differences in hygiene program costs = savings

Applying this formula we saved 36.819,67 € for 4 months / annually 110.469,01€.

Conclusions: Schülke Preventive program decreased the incidence of HCFA CDI and it was very cost effective.