

PRESSURE MAPPING OF ELDERLY BY O.T. STUDENTS SERVICES LEARNING AND DATA COLLECTION

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ABSTRACT

Pressure ulcers are more prevalent in individuals who are over 70 years of age. Pressure ulcers increase older persons' risk of dying and decrease their overall quality of life.

People who are regular users of wheelchairs are at greater risk for decubitus ulcers because of the pressure caused by prolonged sitting. Areas most affected by sitting are the sacrum, coccyx, ischial tuberosities and greater trochanters.

Pressure mapping "is a clinical tool that assists the selection of seat cushions for pressure management for wheelchair users". Literature concluded that pressure mapping was a reliable method of assessing seating support surfaces.

This research project was completed as a part of a service learning project for occupational therapy (OT) students, who were at the time, enrolled in an Assistive Technology class. Two cohorts of OT students visited a local assisted living facility (ALF), with no on-site therapy services. The administrator of the facility identified 20 residents who "many need a wheelchair cushions" or "have wheelchair maintenance issues". The primary investigator (the faculty who taught class) trained the student on using pressure mapping (XSENSOR® Technology), on how to read and interpret the quantitative pressure mapping numbers. The instructor also taught students how to use high-density foam to customize a cost-effective wheelchair cushions.

The students collected pressure mapping numbers before intervention, fabricated the cushions, and collected data after they issued the cushions to the residents.

Results: students measured residents' Average pressure, Peak pressure, and Area over which pressure is distributed. Majority of residents had a decrease in the average pressure, results varied from 0.2 mmHg to 5 mmHg. The average for all 20 residents was a drop of 0.55 mmHg, the mean in Peak pressure dropped significantly from 143.69 to 89.18 mmHg, and the Area of pressure distribution increase (sign of improvement) from 220.19 to 247.41.

Pressure ulcer

Pressure ulcers, also known as decubitus ulcers, bedsores, pressure sores, have various definitions. According to Campbell and Parish (2010, p. 527), the most accurate definition of a decubitus ulcer is, " a breakdown of skin, usually over a bony prominence, due to compromised blood flow caused by pressure." Mechanisms that can lead to ulcer formation include oxygen deprivation, direct cell deformation, ischemic reperfusion injury, and impaired lymphatic drainage (Demarre et al., 2015). Predictive factors of ulcer development are "the presence of non-blanchable erythema, having a urogenital disorder, and higher body temperature" (Demarre et al., 2015, p. 398).

Pressure ulcers are more prevalent in those over the age of 70 (Bansal, Scott, Stewart, & Cockerell, 2005 in Khor et al., 2014). Pressure ulcers increase older persons' risk of dying and decrease their overall quality of life (Khor et al., 2014). There is a large physical, emotional, and financial burden associated with pressure ulcer formation. Khor et al. (2014, p. 536) found that

formation of ulcers could be predicted by "institutionalization, concurrent infection, and high neutrophil counts."

According to Bhattacharya & Mishra, (2015) those who are regular users of wheelchairs are at greater risk for decubitus ulcers because of the pressure caused by prolonged sitting. Areas most affected by sitting are the sacrum, coccyx, ischial tuberosities and greater trochanters. These areas tend to develop pressure ulcers more quickly because they contain bony prominences and less cushion (fat). With proper management and with the help of protective devices, decubitus ulcers can be preventable (Bhattacharya & Mishra, 2015). The National Pressure Ulcer Advisory Panel posits six recommendations to guide the prevention of pressure ulcers.

Service Learning

Is an out-of-classroom, community service experience or a project. Normally attached to an organized course/s. service learning happens outside the university classrooms. Students engage in an organized service activity that meets identified community needs, upon completion students reflect on their service activities in order to better understand the course content and to enhance their sense of civic responsibilities.

OT students were enrolled in an introductory Assistive Technology class. Two cohorts of the OT students visited a local assisted living facility (ALF). The students needed more exposure to real-life clients, in order to improve their clinical skills, communication skills and to have a better understanding of the seating and positioning aspects of the AT class. Residents of the ALF facility has no on-site therapy services and the administrator of the facility was able to identify 20 residents who may need a cushion or a wheelchair maintenance.

Data collection

The students were instructed and trained on conducting basic positioning evaluation, including measuring with pressure mapping technology. Student collected all pre-intervention data, went back to the classroom and outlined the best cushion that would help reduce the pressure. They did that based on

cushion selection criteria that was made available to them. After fabricating the custom-cushion students returned to the ALF and issued the cushion to the residents, and conducted a post-assessment, in some cases minor adjustments were made onsite.

RESULTS

Students measured Residents' Average pressure, the Peak highest pressure, and Area over which pressure is distributed. Students also photographed residents' posture to document progress.

Majority of residents had a decrease in the average pressure, results varied from 0.2mmHg to 5 mmHgs. The average for all 20 residents was a drop of 0.55 mmHg, the mean in Peak pressure dropped significantly from 143.69 to 89.18 mmHg, and the Area of pressure distribution increase (sign of improvement) from 220.19 to 247.41. Interestingly enough some residents increased in their Average pressure after the intervention, those residents had very significant increase in the Area of pressure distribution, and significant degrees in the Peak pressure. See table 1.

Other qualitative data were collected regarding students views on service learning, and feedback following exposure and handling of real-life-clients versus simulated case scenarios. These data could be analyzed in a different publication.

The research has obviously some limitation, the small sample size, the fact that students were novices at these skill and technology could raise issues of reliability of testing.

IMPLICATIONS:

This research concluded that pressure relief can be achieved after proper pressure mapping testing using high-density foam. Service learning is invaluable tool for teaching clinicians.

Table 1: Before and After Pressure mapping

Client	Before			After		
	Average	Peak	Area	Average	Peak	Area
1	35.3	108.2	211.3	32.9	60	254.8
2	38.2	256	104.3	31.8	113.3	244.3
3	33.2	91.3	239.8	33.4	62.3	290.8
4	35.8	134.2	253.3	40	66.4	270.3
5	36.4	256	190.8	34.9	114.6	240.8
6	31.7	104.9	231.5	31.4	58.8	262
7	31.7	256	182.5	30.5	134.4	232.5
8	34.7	256	167.8	35.2	114.9	263.5
9	46.7	88	300.8	50.1	97.3	302.3
10	37	115.1	222.8	39.8	114.1	280.8
11	34	79.1	273	31.5	65.7	268.3
12	31.6	70.6	272	35	67.8	253.3
13	32.4	66	274	35.1	76.3	278.8
14	35.6	236.2	208	29.5	67.8	201.8
15	44.9	92.3	255.5	44.3	116.2	274.8
16	33.8	90.5	244.5	31.8	67.3	278.8
17	40.6	89.3	293.3	42.3	122.5	277.8
18	29.5	153.3	218.65	30.2	141.7	198.9
19	32.5	180.9	233.5	36.6	69.5	230.5
20	34.2	149.8	26.5	22.4	52.7	43
Means	35.49 mmHg	143.69 mmHg	220.19	34.94	89.18	247.41

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