

4.3. Practice assessment

4.3.1. Part one of practice assessment: comparison between nonintervention and intervention groups according to disposal of insulin syringes or pen needles at health care facilities.

As indicated in table (4.8) and figure (4.7), the results of the two analyses for the first part of the practice assessment were identical. The proportion of individuals who disposed of their insulin syringes or pen needles at medical facilities began to differ noticeably from the first postintervention visit, with the intervention group consistently surpassing the nonintervention group. The findings of the current study indicated that the proportion of participants who disposed of sharps properly in the intervention group was 0% at the baseline visit and significantly improved at the following two postintervention visits which peaked at 94% and 96% according to intention to treat analysis and per-protocol analysis respectively. However, in the nonintervention group, the proportions of patients with proper disposal practices did not change over time and registered 2% at all visits as shown in table (4.8). Fisher's exact test revealed that there was a statistically significant difference in the proportion of participants who disposed of sharps at health care facilities between the nonintervention and intervention groups; at the two months ($p = 0.001$); and four month visits ($p < 0.001$) as presented in table 4.8.

Table (4.8): Comparison of proportions of disposing of insulin syringes or pen needles at health care facilities (n =100) (El-Horraya polyclinic, 2023)

Variable	Intent to treat analysis			Per protocol analysis		
	Intervention (n = 50)	Nonintervention (n = 50)	<i>p value</i> [‡]	Intervention (n = 49)	Nonintervention (n= 48)	<i>p value</i> [‡]
Baseline visit	0 (0%)	1 (2%)	1.000	0 (0%)	1 (2%)	1.000
First post-intervention visit	47 (94%)	1 (2%)	<.001*	47 (96%)	1 (2%)	<0.001*
Second post-intervention visit	47 (94%)	1 (2%)	<.001*	47 (96%)	1 (2%)	<0.001*

* Significant results < 0.05. ‡ Fisher's exact test *p values*

In the intervention group, the Cochran Q test was used to determine whether the practice of disposing of sharps at healthcare facilities varied over the three visits, and the results indicated a significant major difference [$Q = 94$, $df = 2$, $p < .001$, effect size (η^2) = 0.94]. Meanwhile, for the nonintervention group, there was no statistically significant difference over time as shown in table (4.9). Then, the post hoc McNemar tests for the pairwise comparisons between visits showed that there was a statistically significant higher percentage of people who were disposing of insulin syringes or pen needles at healthcare facilities in postintervention visits compared to baseline visits in intervention group (Table 4.10). In contrast, the proportions of patients with proper disposal practices did not change between visits in the nonintervention group.

Table (4.9): Cochran Q test results for the repeated measures of the proper disposal of insulin syringes or pen needles at health care facilities (n =100) (El-Horraya polyclinic, 2023).

Treatment group	Comparison	Intent to treat analysis				Per protocol analysis			
		Improper	Proper	Q (df)	p value	Improper	Proper	Q (df)	p value
Intervention	Baseline	50 (100%)	0 (0%)	94 (2)	<0.001*	49 (100%)	0 (0%)	94 (2)	<0.001*
	Two months follow up	3 (6%)	47 (94%)			2 (4%)	47 (96%)		
	Four months follow up	3 (6%)	47 (94%)			2 (4%)	47 (96%)		
Nonintervention	Baseline	49 (98%)	1 (2%)	NA	NA	47 (98%)	1 (2%)	NA	NA
	Two months follow up	49 (98%)	1 (2%)			47 (98%)	1 (2%)		
	Four months follow up	49 (98%)	1 (2%)			47 (98%)	1 (2%)		

Table (4.10): The pairwise McNemar comparisons between visits for the proper disposal of insulin syringes or pen needles at health care facilities (n =100) (El-Horraya polyclinic, 2023).

Variable	Intent to treat analysis		Per protocol analysis	
	Intervention (n = 50)	Nonintervention (n = 50)	Intervention (n = 49)	Nonintervention (n= 48)
Baseline visit vs 2	<0.001*	1.000	<0.001*	1.000
Baseline visit vs 3	<0.001*	1.000	<0.001*	1.000
Visit 2 visit vs 3	1.000	1.000	1.000	1.000

* Significant results < 0.05.

NA: not applicable (constant proportions for all visits)

From the data in figure (4.7), it is apparent that there was a vast difference between nonintervention and intervention groups regarding the proportion of respondents who practiced a proper community sharps disposal method (disposing of sharps at health care facilities) at the first and second postintervention visits whereas, no significant difference was observed at the baseline visit.

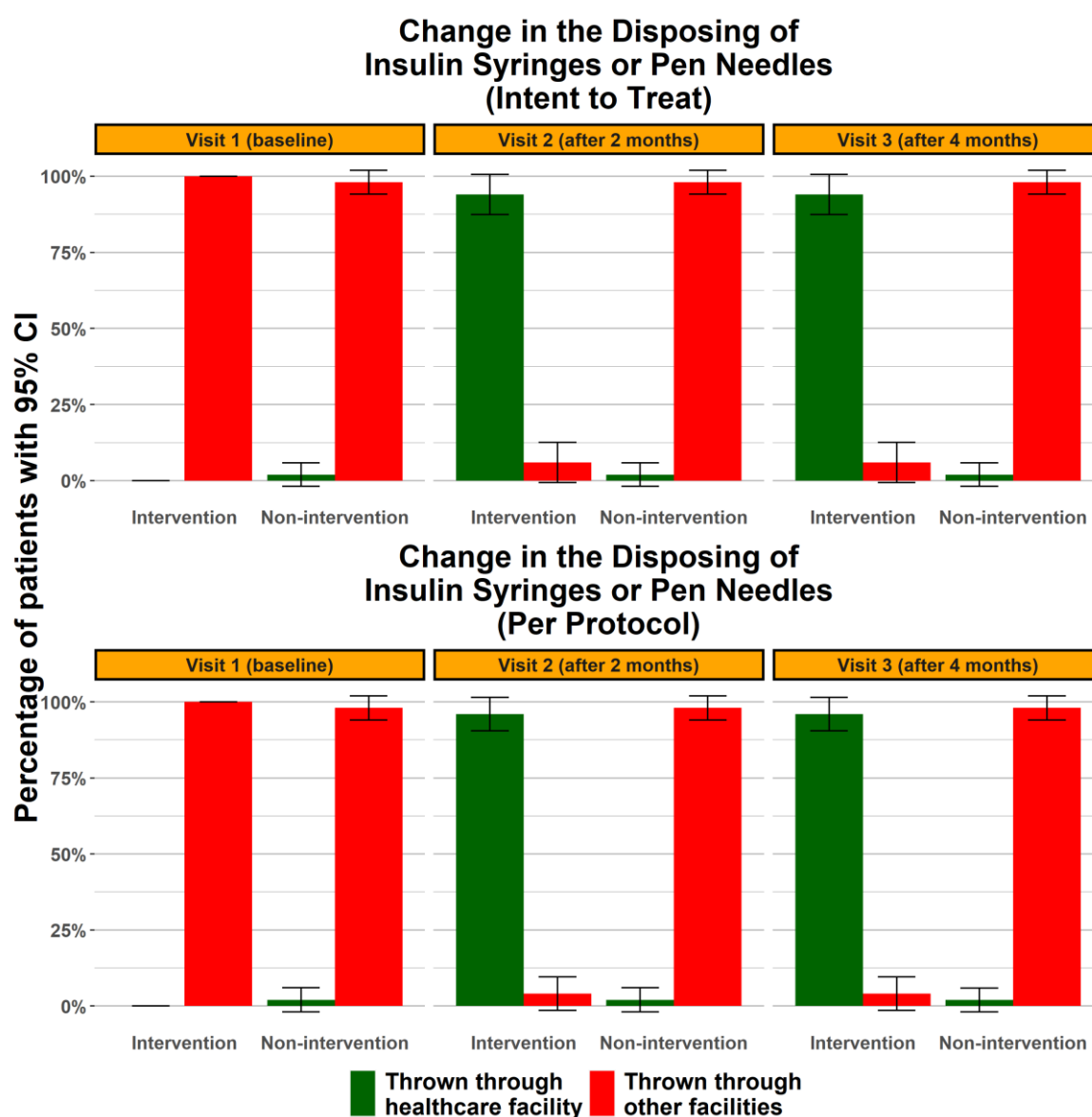


Figure (4.7): Change in the proportion of disposing of insulin syringes or pen needles at health care facilities over visits

4.3.2. Part two of practice assessment.

4.3.2.1. Practice scores and categories pre- and postintervention.

The distribution of the studied diabetic patients according to practice scores and levels pre- and postintervention is explained in Table 4.11. The differences between groups regarding practice scores and levels at different visits were tested by using Wilcoxon rank sum test (Mann-Whitney). The findings of the intent to treat and per protocol analyses for the part two practice assessment were identical, as shown in table (4.11), figure (4.8), and figure (4.9). The practice levels and scores of both groups were almost the same at the baseline visit, which corresponds to the poor practice scale. At the subsequent two visits, there were noticeable differences in participants' practice levels and scores, with the intervention group significantly outperforming the nonintervention group in both measures. The first postintervention visit results show that the participants of the intervention group had a higher median practice score of 7.8 (6.7-8) which corresponds to good clinical practice in both analyses, as compared to that of the nonintervention group which was 4.4 (3.3-5.6) and 4.4 (3.3-5.5) according to intent to treat analysis and per protocol analysis, respectively, and the difference reached statistical significance (<0.001). Likewise, at the second post-intervention visit, there was a nearly double median practice score of 8 (7.8-9) in the intervention group compared to the nonintervention group score of 4.4 (3.3-5.6) according to both analyses ($P<0.001$), as shown in Figure 4.8. Similarly, the current study showed that there were statistically significant differences between the two groups in terms of practice levels at the first and the second postintervention visits. At the first post-intervention visit, it was found that the proportion of participants with a good practice level in the intervention group increased significantly from 0% at baseline to 68% and 69% according to intent to treat and per protocol analyses, respectively, whereas in the nonintervention group, it remained unchanged at 4% in both analyses ($P<0.001$).

Moreover, the proportion of respondents with a good practice level in the intervention group at the second postintervention visit was 84% and 86% according to intent to treat and per protocol analyses respectively in contrast to 4% (both analyses) in the nonintervention group, which remained unchanged from the previous visit ($P < 0.001$). The differences between the intervention and nonintervention groups regarding the practice levels at different sessions are highlighted in figure (4.9) according to intention to treat and per protocol analyses.

Table (4.11): Practice scores and levels pre- and postintervention (n =100)
(El-Horraya polyclinic, 2023)

Variable	Intent to treat analysis			Per protocol analysis		
	Intervention (n = 50)	Nonintervention (n = 50)	P	Intervention (n = 49)	Nonintervention (n= 48)	P
Baseline visit						
Practice score, Median (IQR)	4.4 (4-5)	4.4 (3.3-5.5)	0.585	4.4 (4-5)	4.4 (3.3-5.6)	0.671
Practice level						
Poor	30 (60%)	31 (62%)	0.441	29 (59%)	29 (60%)	0.477
Fair	20 (40%)	17 (34%)		20 (41%)	17 (35%)	
Good	0 (0%)	2 (4%)		0 (0%)	2 (4%)	
Median (IQR)	1 (1-2)	1 (1-2)	0.971	1 (1-2)	1 (1-2)	0.966
First post-intervention visit						
Practice score, Median (IQR)	7.8 (6.7-8)	4.4 (3.3-5.6)	<0.001*	7.8 (6.7-8)	4.4 (3.3-5.6)	<0.001*
Practice level						
Poor	2 (4%)	30 (60%)	<.001*	1 (2%)	28 (58%)	<0.001*
Fair	14 (28%)	18 (36%)		14 (29%)	29 (38%)	
Good	34 (68%)	2 (4%)		34 (69%)	2 (4%)	
Median (IQR)	2 (2-3)	1 (1-2)	<0.001*	2 (2-3)	1 (1-2)	<0.001*
Second post-intervention visit						
Practice score, Median (IQR)	8 (7.8-9)	4.4 (3.3-5.6)	<0.001*	8 (7.8-9)	4.4 (3.3-5.6)	<0.001*
Practice level						
Poor	1 (2%)	28 (56%)	<0.001*	0 (0%)	26 (54%)	<0.001*
Fair	7 (14%)	20 (40%)		7 (14%)	20 (42%)	
Good	42 (84%)	2 (4%)		42 (86%)	2 (4%)	
Median (IQR)	3 (2-3)	1 (1-2)	<0.001*	3 (2-3)	1 (1-2)	<0.001*

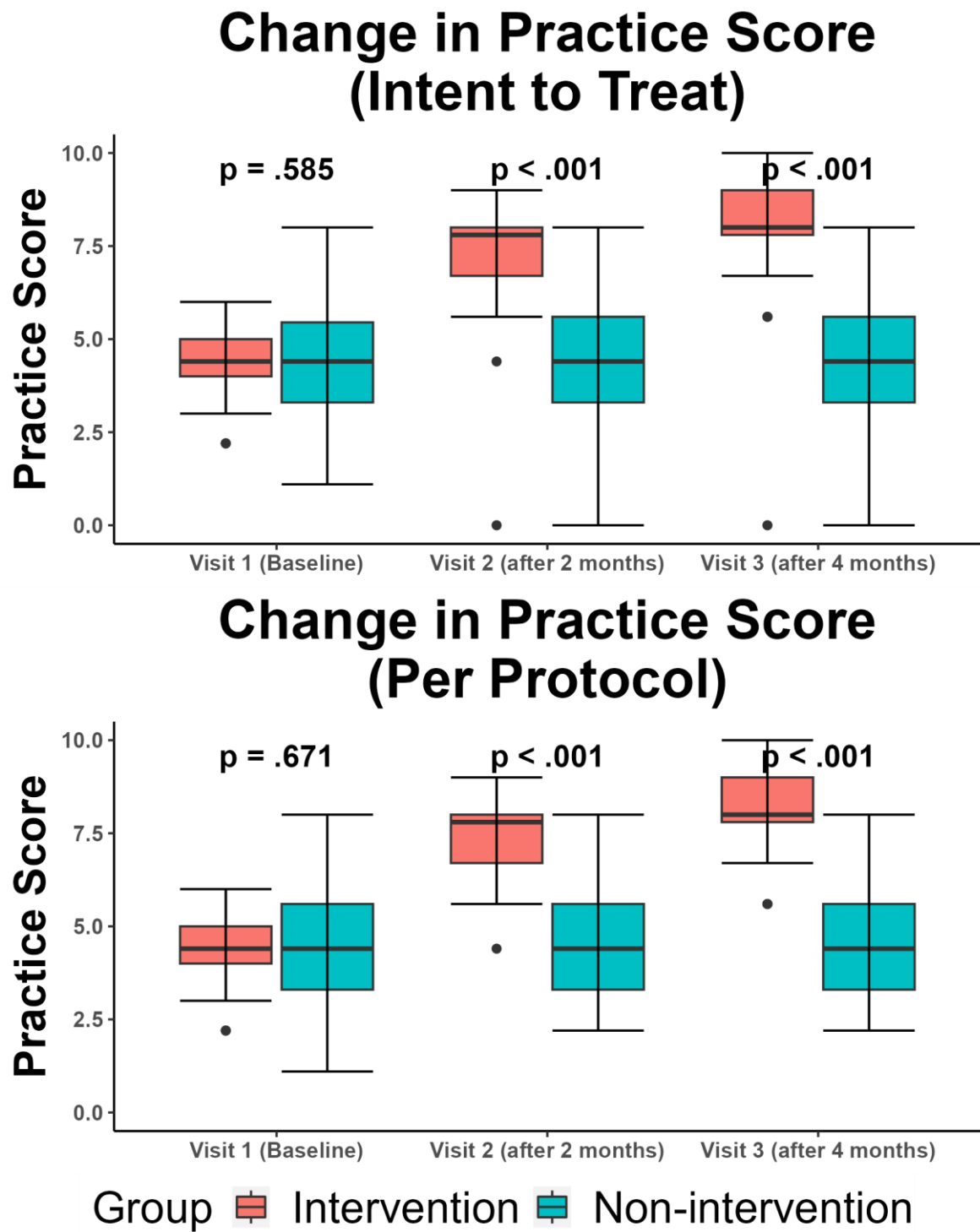


Figure (4.8): Change in practice scores through the visits

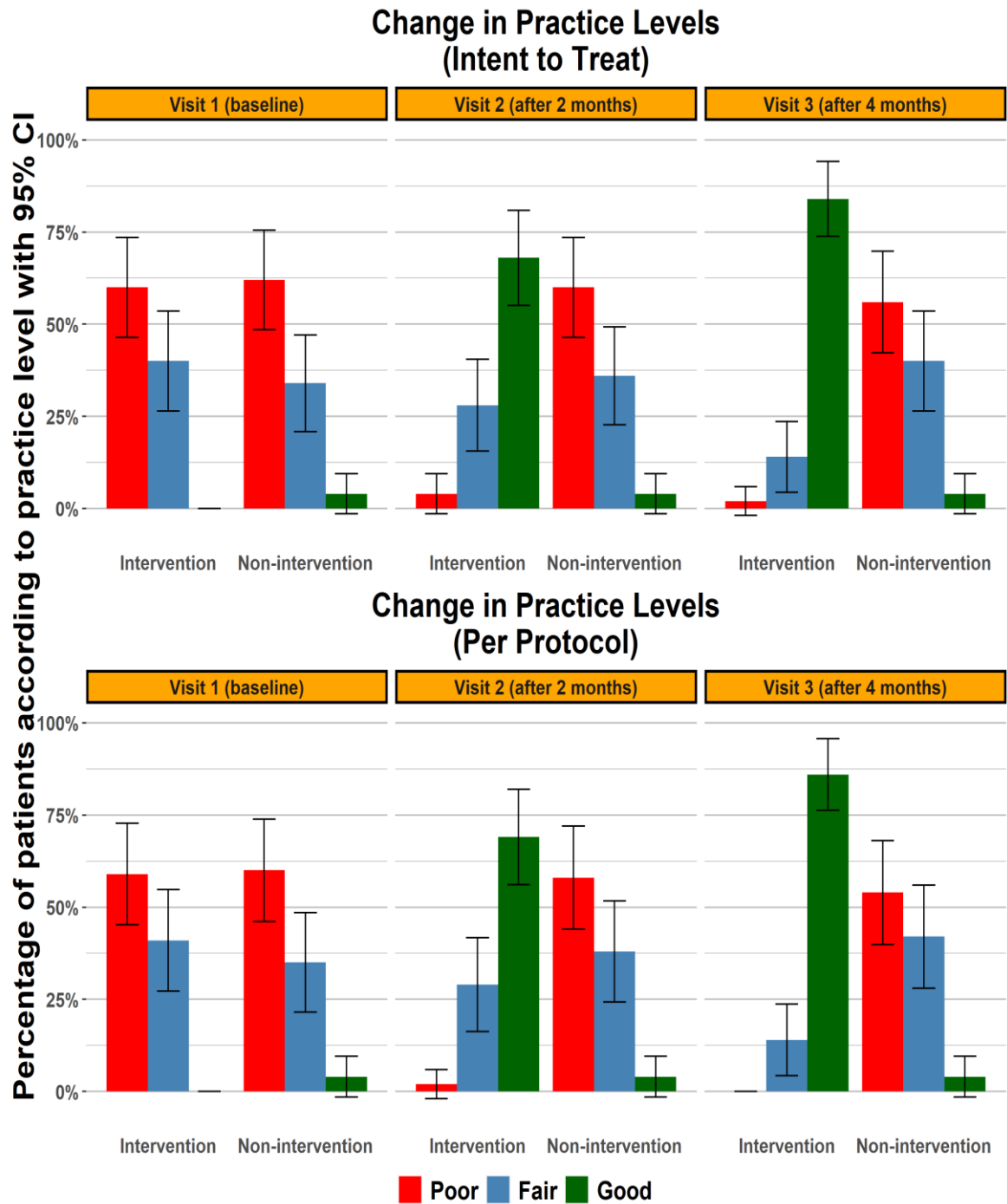


Figure (4.9): Change in practice levels through the visits

4.3.2.2. Within group difference (time effect) regarding practice scores and levels

The within group difference (time effect) was investigated by using the Friedman test for the repeated measures of the practice scores and levels in both groups. Table (4.12) shows that ;in the intervention group; there were significant large differences in the practice scores between visits in both analyses [$X^2(2) = 85.8$, $p < 0.001$, effect size = 0.86 and $X^2(2) = 90.5$, $p < 0.001$, effect size = 0.92] and significant small differences in the practice levels [$X^2(2) = 7.5$, $p < 0.001$, effect size 0.08 in both analyses]. However, there were no significant differences between the practice scores or the levels in the nonintervention group.

Table (4.12): Friedman test χ^2 values and effect sizes (Kendall W) for the repeated measures of the practice scores and levels (n =100) (El-Horraya polyclinic, 2023).

Group	Item	Intent to treat analysis				Per protocol analysis			
		Friedman χ^2 (df)	Kendall W	Effect size	<i>p</i> value	Friedman χ^2 (df)	Kendall W	Effect size	<i>P</i> value
Intervention	Score	85.8 (2)	0.86	Large	<0.001*	90.5 (2)	0.92	Large	<0.001*
	Level	7.5 (2)	0.08	Small	0.023*	7.5 (2)	0.08	Small	0.023*
Nonintervention	Score	0.05 (2)	0.00	Small	0.973	0.84 (2)	0.05	Small	0.658
	Level	2.8 (2)	0.03	Small	0.247	2.8 (2)	0.03	Small	0.247

* Significant results $p < 0.05$

Subsequent post hoc pairwise comparisons were performed to test the difference between each pair of visits. In the intervention group, there were substantial gains in practice scores and levels at postintervention visits compared to the baseline visit and at the second postintervention visit compared to the first postintervention visit, as shown in table (4.13). These results reflect the positive impact of the program on sharps disposal practices.

Table (4.13): The pairwise comparisons of practice scores and levels between visits in the intervention group (n =100) (El-Horraya polyclinic, 2023).

	Baseline visit vs First post-intervention visit	Baseline visit vs Second post-intervention visit	First post- intervention visit vs Second post- intervention visit
Intent to treat analysis			
Part 2 score	<0.001*	<0.001*	<0.001*
Part 2 level	<0.001*	0.009*	0.014*
Per protocol analysis			
Part 2 score	<0.001*	<0.001*	<0.001*
Part 2 level	<0.001*	0.009*	0.014*

* Significant results $p < 0.05$

4.3.2.3. Proportions of the right answers to part 2 of the practice assessment at each visit.

The proportions of patients in the intervention and nonintervention groups at each visit who correctly answered the practice assessment questions were compared by the Chi-square test as shown in table (4.14) and figure (4.10). The current results demonstrated that the questions numbered 2, 3, 4, 8, 9 and 10 were significantly impacted by the educational program. However, there was no statistically significant difference between the proportions of right answers in other questions between the nonintervention and intervention groups. At both post intervention visits, the intervention group outperformed the nonintervention group on questions 2, 3, 4, 8, and 10 while only outperforming the nonintervention group on question 9 at the second postintervention visit.

From the data in Table 4.10, it is apparent that when asking about the bending of needles after use in the first question, the study findings showed that there was a significant reduction in the proportion of diabetic patients in the intervention group who yielded syringe needles after using from 24% at baseline visit.

Regarding the type of container used for sharps disposal in second question, there was an enormous increase in the proportion of the respondents in intervention group who identified the choice of heavy duty and capped plastic or metal containers as correct answers and registered 2% at the baseline visit. The percentage peaked at 100% at the first and second post-intervention visits, while that of the nonintervention group remained unchanged at 0% across visits.

For the third question which was concerned with the presence of a person who gave advice on how to dispose of the used insulin syringes and pen needles, the current study showed that the proportion of the respondents in the intervention group who considered the choice of health

care workers as the right answer was 2% at the baseline visit. The proportion was vastly increased to 100% at the second and third follow up visits in comparison to the nonintervention group which was stuck at 1% over three visits.

The methods of disposing of sharps outside the home were assessed by the fourth question. The study results show that 20 (40%) and 24 (48%) of the participants in the intervention and nonintervention groups, respectively, demonstrated the right practice (brought sharps to the home) at the baseline visit. At the first and the second post-intervention visits, there was significant improvement in the intervention group where about three quarter of the respondents practiced properly in returning sharps to home. However, the results did not demonstrate any change in the nonintervention group which mirrored the program's effectiveness.

Regarding lancets disposal in the eighth question, the present study found that there was not anybody in the intervention group who demonstrated correct practice regarding lancets disposal, while in the nonintervention group, there was only one (2%) participant who threw lancets through health care facilities.

What is exceptional in the results was those of the ninth question where the proportion of patients who reused their syringes or pen needles in the intervention group was 98% at the baseline and first postintervention visits as shown in figure (4.10) and a substantial improvement was observed at the second postintervention visit where it recorded 59%. However, there was not any change in the nonintervention group, and it stopped at 2%. This result can be explained by the fact that the researcher began to provide participants with new syringes and insulin pen needles at the first post-intervention visit when they exchanged their

used sharps containers so that, when the participants were provided with both educational and practical tools, they behaved correctly.

The fifth question in the current study illustrated that no one at the baseline visit demonstrated needle stick injury to the others in the intervention group and only 1% had an incident at both the first and second postintervention visits. Similarly, the sixth question's answers demonstrated that there was no participant in either group sharing syringes with others.

Last, the present study concluded that there was a significant increase in the percentage of respondents who kept insulin syringes away from children or other people after implementation of the program from 60% at the baseline visit to 76% at both post intervention results, whereas it remained almost unchanged over time in the nonintervention group.

Table (4.14): Proportions of the correct answers to part 2 of the practice assessment at each visit (n =100) (El-Horraya polyclinic, 2023)

Question	Baseline visit		P	First post-intervention visit		P	Second post-intervention visit		P
	Intervention	Nonintervention		Intervention	Nonintervention		Intervention	Nonintervention	
1- Bending the needles of insulin syringes before throwing them away: No	38 (76%)	42 (84%)	0.453	45 (92%)	42 (88%)	.524	45 (92%)	42 (88%)	.524
2- The type of container used: Heavy duty and capped plastic or metal container	1 (2%)	0 (0%)	1.000	49 (100%)	0 (0%)	<0.001*	49 (100%)	0 (0%)	<0.001*
3- The presence of a person who gave you advice on how to dispose of your used insulin syringes: Health care workers	1 (2%)	1 (2%)	1.000	49 (100%)	1 (2%)	<0.001*	49 (100%)	1 (2%)	<0.001*
4- When you are outside the home, the used insulin syringe should be: Brought to home	20 (40%)	24 (48%)	0.546	38 (78%)	24 (50%)	0.009*	37 (76%)	23 (48%)	0.01*
5- History of needle stick injury to others: No	50 (100%)	48 (96%)	0.495	48 (98%)	46 (96%)	0.617	48 (98%)	46 (96%)	0.617
6- Sharing the insulin syringes and pens with others: No	50 (100%)	50 (100%)	1.000	49 (100%)	48 (100%)	1.000	49 (100%)	48 (100%)	1.000
7- Using of blood glucose monitoring device (BGMD) at home: Yes	22 (44%)	18 (36%)	0.540	23 (47%)	18 (38%)	0.462	24 (49%)	19 (40%)	0.467
8- Method of discarding the lancets: Thrown through health care facilities	0 (0%)	1 (2%)	0.439	12 (52%)	1 (2%)	0.004*	20 (80%)	1 (2%)	<0.001*
9- Using insulin syringes or needles more than once: No	1 (2%)	1 (2%)	1.000	1 (2%)	1 (2%)	1.000	29 (59%)	1 (2%)	<0.001*
10- Keeping insulin syringes away from children or other people: Yes	30 (60%)	22 (44%)	.161	37 (76%)	23 (48%)	0.01*	37 (76%)	24 (50%)	0.017*



Figure (4.10): Patients with right answers to the practice (part 2) questions at each visit.

