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Knowledge, Attitude and Practice about a Newer Class of Antidiabetic Drug (Glucagon-like peptide-1 receptor agonist) Among the Health Care Professionals of Qassim University, Saudi Arabia**Alwaleed Yousef Aldhobaib¹, Syed Imam Rabbani^{2,*}, Mugahid A Mobark³**¹Pharm D Graduate, College of Pharmacy, Qassim University, Buraydah-51452, Saudi Arabia²Department of Pharmacology and Toxicology, College of Pharmacy, Qassim University, Buraydah-51452, Saudi Arabia³Department of Pharmacy Practice, College of Pharmacy, Qassim University, Buraydah-51452, Saudi Arabia

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ABSTRACT

Glucagon-like peptide-1 receptor agonist (GLP-1RA) is a newer class of drugs used in the treatment of adult type-2 diabetes mellitus. The use of the drugs needs appropriate methods of administration including precautions and carry some potential risks such as pancreatitis and thyroid cell neoplasia. In this cross-sectional study, a pre-validated questionnaire with fixed-answers was used to assess the medical practitioner's response towards recently approved drugs. Their replies were recorded in an excel sheet. The data was subjected to statistical analysis using one-way ANOVA and post-hoc tests to determine the significant value. $p < 0.05$ was used to indicate the significance of the results. The data from the study indicated that 107 health care professionals such as physicians, nurses and pharmacists with differences in age, gender, nationality, qualification and experience took part in the survey. The overall correct response to the questions of knowledge domain was found to be 73.5%, attitude – 78.5% and practice – 80.3%. However, some critical information about the method of administration, precautions and possible risks associated with the therapy is lacking among the participants. A significant variation ($P < 0.05$) was found for some of the demographic variables such as profession, qualification and age of the participants. The finding from the study suggests that the medical professionals have good knowledge, better attitude and proper practice about the GLP-1RA that is being approved for the treatment of type-2 diabetes mellitus. However, some of the vital aspects of the medication need update. Continuing medical education programs could be one of the most suitable strategies suggested for enlightening the information on the recent additions to the therapy.

Keywords: Knowledge; Attitude; Practice; Medical professionals; Type2 diabetes; GLP1RA

INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disease that needs ongoing medical treatment and continuing education and encouragement for patient self-management to avoid acute illness and elimination of the risk of complication in long term.¹ Treatment for DM is complex and includes multi-factorial methods beyond glycemic management of reducing the complications of chronic hyperglycemia. There is a wide body of evidence that supports a number of approaches to enhance the outcome of diabetes. Diabetes is a disease that never goes away, but it can be monitored.²

Among the three types (diabetes mellitus type-1, diabetes mellitus type-2 and gestational diabetes), the prevalence of type-2 diabetes was found to be 90%. An estimated 425

million people worldwide (10.2% of total population) are suffering from the disease. The global healthcare expenditure in managing the diseased condition has crossed USD 727 billion. China, India and United States of America were reported to be the top three countries with maximum number of patients between the ages 20 – 79 years.³

According to a report from World Health Organization (WHO), Saudi Arabia ranks the second highest in the Middle East, and is seventh in the world for the rate of diabetes. The study estimates that around 7 million of the population is diabetic and almost around 3 million have pre-diabetes.⁴ Even more worrying is the rate at which the disease is increasing. One of the disturbing trends is that the disease is becoming one of the leading cause for

death among the population.⁵ The economic burden due to the DM in Saudi Arabia is predicted to rise to catastrophic level, unless a wide ranging epidemic control program is launched. To control the prevalence, a multidisciplinary approach is needed at level including the patient education and healthcare providers updating of the knowledge.⁶

Several classes of antidiabetic drugs such as sulphonylureas, biguanides, meglitinides, thiazolidinediones, alpha-glucosidase inhibitors, etc., are available for treating DM. Although, these medications are extensively used, however, optimum achievement in the management of disease is a far reaching goal.⁷ These medications are associated with potential adverse effects, which make the treatment a challenging task. Studies have suggested that due to complications and unwanted side effects, patient themselves stops the medications resulting in several long term complications of mismanaged hyperglycemia.⁸

Recent studies indicated that incretin system could be vital targets in the treatment of type-2 diabetes mellitus. Incretins are hormones produced by the intestinal mucosa in response to food. Two incretin hormones have been identified namely, glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 (GLP-1).⁹ GLP-1 receptor agonists are newer class of compounds that have been approved for the treatment of type-2 diabetes mellitus in adults. The drugs are known to reduce the blood glucose at the moderate level. The safety profile of the drug indicates that administration of GLP-1RA can cause pancreatitis, local irritation, gastric upset and can increase the risk of thyroid C-cell neoplasia. The medication is contraindicated in pregnancy and lactating mothers as the safety profile in these patients is incomplete.¹⁰ Since this group of compounds were recently introduced, thorough information is essential for safe use of medications.

Studies conducted in the past revealed a conflicting data about the knowledge, attitude and practice (KAP) about several medications. Inadequate KAP has been reported to complicate the therapeutic approaches in the management of chronic illness such as diabetes mellitus.¹¹ In one such study conducted in India, it was found that the patients have significant lower knowledge about the purpose of using insulin in the therapy of diabetes mellitus.¹² One of the approaches is to assess the KAP among the health care professionals by conducting survey in scientific manner and analyze their response statistically. Such studies could provide data for designing the strategies to enhance the medical information among the practitioners.¹³ Hence, this study is planned to evaluate the KAP of newer class of antidiabetic agents such as GLP-1 RA among the medical professionals of the Qassim University.

METHODS

The purpose of the present study is to assess the knowledge, and measure the professional attitude and practice of

healthcare personnel about a new class of antidiabetic drugs such as GLP-1RA in Qassim University.

Study setting and ethical approval

This study was conducted in Qassim University among the professionals involved in providing the health care services to the patient as well as teaching and training the students. The study conducted after ethical approval (No. 20.02.08) from the Deanship of Scientific Research, Qassim University dated 7/12/2020 was provided.

Study tool

The questionnaire were targeted to medical professionals such as doctors, nurses and pharmacists to evaluate their knowledge, attitude and practice about the newly approved antidiabetic drugs called glucagon-like peptide-1 receptor agonists (GLP-1RA).

Questionnaire development

A questionnaire was developed in English language. The questionnaire was divided into two parts namely, socio-demographic section and KAP section. In socio-demographic part, information about the respondents such as age, sex, profession, qualification and experience was collected. While in the KAP, questions related to knowledge had set answers such as 'Yes', 'No' and 'Don't know'. The questions about the attitude and practice had the fixed-answers such as 'Strongly agree', 'Agree', 'Neutral', 'Disagree' and 'Strongly disagree'.¹⁴ The expert committee constituted by the department of pharmacology and toxicology validated the questionnaires. A pilot study was done before the questions were circulated for the data collection. Randomly selected medical personnel from different professions were used in the pilot study. The expert committee analyzed their feedback and modified the questionnaire accordingly. The members of the committee evaluated each question and determined the criteria for scoring the response. In addition, expert committee suggested the sample size for the present study depending on the parameters such as number of medical professionals employed in the University, confidence interval and margin of error.

Study design

This was a cross-sectional questionnaire-based survey. The professionals who are involved in providing the health care services as well as teaching and training the students such as physicians, nurses and clinical pharmacists were included in survey to assess their KAP about GLP-1RA.¹⁵ The potential participants were contacted personally and the most suitable time for them was fixed to conduct the survey.

Inclusion and exclusion criteria

Those medical professionals in the Qassim University willing to participate in the questionnaire-based study were included while vice-versa was considered as exclusion criteria.

Scoring criteria

The criteria for scoring the responses were adopted from previous study.¹⁵ There were 16 questions in total and each domain consisted of 6 questions. In the knowledge domain, correct answer to every question carried +1 mark while wrong -1 and don't know carried 0 mark. This gave a total score range of +6 to -6 for knowledge. In the 'attitude' and 'practice' domains, the level of agreement or disagreement for the questions were calculated as; Strongly agree = +2, Agree = +1, Neutral = 0, Disagree = -1 and Strongly disagree = -2. Hence, for these domains the total score varies between +12 to -12. If the scores were above 70%, then the response was categorized as 'Good', between 51 – 69 % was categorized as 'Fair' and less than 50% was recorded as 'Poor'.¹⁶

Statistics

All completed survey forms were evaluated and their response was recorded in an excel spreadsheet. The data was analyzed and statistical significance of the results was done through One-way ANOVA followed by non-parametric post-hoc test such as Mann-Whitney U test, Kruskal-Wallis H test and Chi-square test.¹⁷ Mann-Whitney U was used to compare scores of each domain with binary demographic groups: (Gender and Nationality). Kruskal-Wallis H was used to compare scores of each domain with demographic with more than two categories (Age, Qualification and Experience). Chi-square test was used to determine whether there is a significant association between each domain scores of the participants and Demographics. Pearson correlation analysis was used to find the relationship between the responses recorded for the domains of knowledge, Attitude and Practices. $P < 0.05$ was considered to indicate the significance.

RESULTS

Demographic characters of study participants

A total of 154 medical professionals of Qassim University were approached, 112 agreed to participate in the survey (response rate = 72.7%) and 5 samples were rejected due to missing data. Physicians constituted the major respondents ($\approx 50\%$) of the study, followed by nurses (33.6%) and pharmacists (16.8%). Among the respondents under physicians' category, 64% were males and 35 % were females. Majority were aged less than 35 years (58%), non-Saudis nationals (67%), possessing masters' or above qualification (60%) and less than 5 years of experience (30.1%) in the

profession.

In the nursing profession, majority were female staff (56.6%), aged less than 35 years (69%), belonging to non-Saudi nationality (78%), possessing bachelors' degree qualification (67%) and professional experience of 6-10 years (33.3%). Majority of pharmacists participated in this study were males (66.6%) having less than 35 years age (56%), Saudi nationals (55.5%), possessing masters' or above qualification (61%) and having less than 5 years of professional experience (33%) (Table 1).

Table 1: Demographic characteristics of medical professionals

Demographic variables		Physicians N (%)	Nurses N (%)	Pharmacists N (%)
Gender	Male	34 (64)	12 (33.3)	12 (66.6)
	Female	19 (35.3)	24 (66.6)	6 (33.3)
Age	Less than 35 Yrs	31 (58)	25 (69)	10 (55.5)
	More than 35 Yrs	22 (42)	11 (30.5)	8 (44.4)
Nationality	Saudi	17 (32.5)	8 (22.2)	10 (55.5)
	Non-Saudi	36 (67)	28 (77.7)	8 (44.4)
Qualification	Diploma	–	7 (19.4)	–
	Bachelors' degree	21 (39.5)	24 (66.7)	7 (38.8)
	Masters' or above	32 (60)	5 (13.8)	11 (61.1)
Experience	Less than 5 Yrs	16 (30.1)	9 (25)	6 (33.3)
	6 – 10 Yrs	12 (22.6)	12 (33.3)	4 (22.2)
	11 – 15 Yrs	14 (26.4)	11 (30.5)	5 (27.7)
	More than 15 Yrs	11 (20.7)	4 (11.1)	3 (16.6)

Note: The values are represented as number (Percentage).

Frequency of correct response on KAP based questions

The frequency of physicians' correct response for the knowledge-based questions varied between 58% to 81%, while the nursing staff was 42% to 70% and pharmacists' was 50% to 82%. Most of the physicians' correctly answered that GLP-1 RA are the latest addition in the management of type-2 diabetes (81%) and the least frequency of correct response was for the question 'GLP-1 RA carry the potential risk of thyroid C-cell neoplasm' (58%). The most frequent correct answer by the nursing staff was for the question that GLP-1 RA can reduce blood pressure (70%) and least frequent was for the potential risk of thyroid C-cell neoplasm associated with GLP-1 RA (42%). Most of the pharmacists indicated that they have the knowledge the GLP-1 RA belongs to the antidiabetic class (82%) and least frequency of answer was found to be for 'GLP-1 RA induced pancreatitis in diabetic patients' (50%). Overall, the medical personnel

has good knowledge about GLP-1 RA as the therapeutic class for diabetes mellitus (82%) and least knowledge about the incidences of thyroid C-cell neoplasm with GLP-1 RA (61%). Comparison of various responses for the knowledge questions indicated no-significant variation.

The frequency of correct answer to the attitude questions by medical professionals are; physicians – 90% (taking consent from patients before starting GLP-1 RA), nurses – 80% (selecting specific needle for parenteral administration of GLP-1 RA) and pharmacists – 84% (discussing benefits and risks of GLP-1 RA with patients). The least frequent correct answer was observed for physicians is ‘eating small portion of meals under GLP-1 RA therapy (59%), for nurses ‘selecting specific GLP-1 RA for patients’ (44%) and for pharmacists was ‘choosing specific size of needle for parenteral administration of GLP-1 RA’ (46%). Altogether, majority of medical professionals agreed that consent of patients is important before starting the GLP-1 RA therapy (95%) and the least was for selecting the specific GLP-1 RA for the patients (61%). The question about the specific needle size for parenteral administration of GLP-1 RA indicated significant variation ($P=0.043$). However, other responses were found to be insignificantly varied.

The most frequent correct answers for practice domain given by physicians’ was ‘possible transient nausea as the side effect after GLP-1 RA treatment’ (92%) and least was ‘literature review for recent additions of GLP-1 RA (70%)’. The nursing staff’s correct answer was for ‘asking patients to report immediately the side / adverse effect’ (74%) and least was for referring the history of patient before starting the GLP-1 RA therapy (42%). The pharmacist’s correct response was for ‘literature review for checking the latest addition of GLP-1 RA’ (83%) and least was for ‘transient nausea after GLP-1 RA medication’ (52%).

Overall, the most frequent correct answer of medical personnel was for ‘reporting immediately possible side / adverse effect of GLP-1 RA (89%) and the least was for ‘localized irritation of nodule formation at the site of injection (70%)’. ‘Referring to patient history before treating with GLP-1 RA’ questionnaires response showed significant variation ($P = 0.039$), while other replies to this domain did not show significant variation (Table 2).

Knowledge, attitude and practice scores against the demographic variables

The KAP scores of the healthcare professionals against the demographic variables is summarized in Figure 1. The knowledge scores of the professionals varies between 4.29 to 5.2 (out of maximum 6). The least score was found to be for the medical professionals who hold the diploma degree (4.29 / 6) as a qualification and the highest scores was observed for the female professionals (5.2 / 6).

In the attitude domain, the highest score was again recorded for the female participants (9.81 / 12) followed

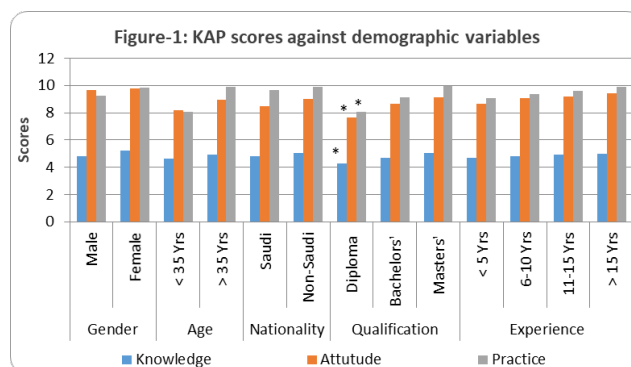


Fig. 1: KAP scores against demographic variables Note: The values are represented as scores.

Statistics: One-way Anova followed by specific non-parametric post-hoc tests as per variables.

*P value less than 0.05.

by above 15 years of experience professionals (9.45 / 12). And the lowest score was found for the diploma qualified persons (7.65 / 12). The practice domain scores indicated again diploma degree holders have low scores (8.07 / 12) and the highest was seen with masters’ or above qualified professionals (9.96 / 12) followed by non-Saudis (9.92 / 12). The statistical analysis revealed significant variations ($P < 0.05$) for the scores of diploma degree holders when compared with masters’ or above qualified medical personnel.

Knowledge, attitude and practice levels of healthcare professionals on recently approved antidiabetic Drugs

3 represents the KAP level of healthcare professionals on the recently approved antidiabetic drugs. At the professional level, physicians were found to have good knowledge (66.8%), attitude (58.6%) and practice (52.9%) followed by pharmacists [knowledge – 55.1%, attitude – 49.3% and practice – 47.3%] and nurses [knowledge – 42.6%, attitude – 40.7% and practice – 36.2%]. A significant variation ($P = 0.03$) was found when the responses were compared between each other.

In the gender variables, female professionals have good knowledge (62.9%), while males have better attitude (50.1%) and practice (58.7%). The age variable indicated that less than 35 years old professionals have good knowledge (70.1%) and attitude (59.8%), but above 35 years have good practice (66.3%) towards GLP-1 RA. The responses for this found to be significantly varied ($P = 0.02$). In the nationality criteria, Saudis were found to have good knowledge (66.9%) and attitude (57.9%) while non-Saudi nationals have proper practice (66.7%). The highest level of knowledge (63.8%), attitude (52.6%) and practice (57.7%) was observed for masters’ or above qualified persons. The experience variable indicated that medical professionals having 6–10

Table 2: Frequency of correct response on KAP based questions by the medical professionals

No	Questions	Physi- cians N (%)	Nurses N (%)	Pharma- cists N (%)	Total	P- value
Knolwedge						
1	Do you have knowledge about Glucagon-like peptide-1 receptor agonists (GLP-1 RA)?	38 (72)	24 (68)	15 (82)	77 (82)	0.146
2	Do you know that GLP-1 RA are the latest addition in the management of type-2 diabetes mellitus?	42 (81)	20 (54)	14 (76)	76 (81)	0.210
3	Is it true that administration of GLP-1 RA do not cause hypoglycemia in diabetes type-II patients?	37 (70)	16 (44)	10 (56)	63 (67)	0.322
4	Is it true that the use of GLP-1 RA can cause reduction in blood pressure?	35 (66)	25 (70)	12 (64)	72 (77)	0.463
5	Are you aware that GLP-1 RA therapy can cause pancreatitis in diabetes patients?	37 (69)	22 (60)	9 (50)	68 (73)	0.289
6	Do you agree that GLP-1 RA carry potential risk of thyroid C-cell neoplasm?	31 (58)	15 (42)	11 (61)	57 (61)	0.593
Attitude						
7	Is it essential to take the consent from patient before starting GLP-1 RA?	48 (90)	27 (74)	14 (80)	89 (95)	0.226
8	I feel moral obligation to discuss the benefits and risk factors associated with GLP-1 RA therapy.	38 (72)	22 (60)	15 (84)	75 (80)	0.384
9	I make efforts to choose the most appropriate GLP-1 RA specific for the patient.	33 (62)	16 (44)	12 (68)	61 (65)	0.141
10	I educate the nursing staff to select the specific size of needle for parenteral administration of GLP-1 RA.	39 (74)	29 (80)	8 (46)	76 (81)	0.043*
11	I recommend patients on GLP-1 RA therapy to eat small portion of meals and then wait 30 minutes before eating more.	31 (59)	23 (64)	11 (60)	65 (70)	0.362
12	I prefer to encourage patient to self-monitor blood glucose a few times daily for a week or two after initiating the GLP-1 RA therapy.	44 (82)	18 (52)	14 (78)	76 (81)	0.672
Practice						
13	I devote time to read literature for recent additions to the GLP-1 RA class of anti-diabetic drugs.	37 (70)	22 (60)	15 (83)	74 (79)	0.471
14	I always refer patient history before treating them with GLP-RA.	44 (82)	15 (42)	13 (70)	72 (77)	0.039*
15	I inform patients taking GLP-1 RA medication about the possible side effects such as transient nausea.	49 (92)	23 (64)	9 (52)	81 (87)	0.621
16	I advise patients on GLP-1 RA therapy the possibility of localized irritation or nodule formation at injection site.	32 (60)	21 (58)	12 (66)	65 (70)	0.503
17	I avoid prescribing GLP-1 RA to pregnant and nursing patients to prevent the complications of medications.	41 (78)	25 (70)	12 (68)	78 (83)	0.372
18	I ask patients on GLP-1 RA therapy to report immediately any unrelenting abdominal pains, hypersensitivity reactions and abnormal growths.	42 (80)	27 (74)	14(76)	83 (89)	0.814

Note: The values are represented as number (Percentage).

Statistics: One-way Anova followed by non-parametric post-hoc tests. *P value less than 0.05.

years of experience has good knowledge (66.6%), slightly better attitude (56.4%). While professionals with more than 15 years of experience have proper practice (60.5%) about the GLP-1 RA. No statistical significant variations were observed except those mentioned above.

Correlation analysis between scores of knowledge, attitude and practice

The correlation analysis between knowledge, attitude and practice is represented in Table 4. The observation suggested that the knowledge response of the healthcare members is weakly related with the attitude and the statistical analysis indicated that the difference is insignificant ($r = 0.14$, $P = 0.11$).

However, the knowledge response of the participants is fairly correlated with the practice and the variation was found to be significant ($r = 0.52$, $P = 0.04$). The correlation between the attitude and practice domain replies were found to be moderately correlated but the variation was non-significant ($r = 0.66$, $P = 0.08$).

DISCUSSION

The present study evaluated the knowledge, attitude and practice about the new class of antidiabetics called glucagon-like peptide-1 receptor agonists (GLP-1 RA) among the healthcare personnel of Qassim University. The demographic characteristics revealed a mixed nationality of participants. Most of the respondents were aged below 35 years, holding bachelor degree as qualification in their specialization and having less than 5 years of experience in their profession. The survey study included the participation of both male and female professionals working in the University (Table 1).

The medical practitioners are an integral and vital component of society since they are involved in providing and maintaining the health of population. Our findings indicated that the medical professionals of the University have 'good' knowledge, 'better' attitude and 'proper' practice about the newer therapeutic agents in diabetes. The overall 'correct' responses to the questions of knowledge domain were found to be 73.5%, attitude – 78.5% and practice – 80.3% (Table 2). The findings of the study are close to the previous research where the healthcare workers indicated similarity in the response.¹⁸

GLP-1 RAs are one of the latest additions of medication for the treatment of type-2 diabetes in adults. This class of drugs reported to increase glucose-mediated production of insulin from pancreatic beta cells. Other actions indicated for this class of drugs include delay in gastric emptying, decreased fasting endogenous glucose release by reducing the glycogenolysis and reduction in food intake through CNS action.¹⁹ These actions have the tendency to reduce the blood glucose but at controlled levels.⁹ Previous report

also suggested that administration of GLP-1RA carry the risk of thyroid C-cell neoplasm and pancreatitis.¹⁰ For these questions, the overall response of the medical professionals in our study is above 60%. However, the individual responses of the healthcare members for these questions were found to be less than 50%, such as for two questions in knowledge domain [Q-3 (Nurses-44%), Q-6 (Nurses-42%)], two questions of attitude domain [Q-9 (Nurses-44%), Q-10 (Pharmacists- 46%)] and one question of practice domain [Q-14 (Nurses-42%)]. Although, the professionals better answered these questions who are directly concerned, but lack of information is reported to jeopardize the concept of better healthcare system.²⁰

The KAP score analysis suggested that the response of the participants for the knowledge domain was 4.27 (71%) to 5.2 (86%), attitude – 7.65 (64%) to 9.81 (82%) and practice – 8.07 (67%) to 9.96 (83%). These scores for the KAP in the previous study suggested that the participants have good knowledge, better attitude and proper practice.¹⁸ The lowest and highest scores of KAP indicated interesting correlation. The response to the knowledge domain was found to be weakly related to attitude (r value = 0.14). The correlation between the replies of knowledge and practice was found to be moderately related (r value = 0.52). In addition, the correlation data between attitude and practice was found to be again moderately related (r value = 0.66). Further, the correlation analysis indicated significant variation when comparison was done between knowledge and practice (Table 4). The data suggests that enhancing the knowledge might not always improve the attitude but knowledge improvement could influence positively the practice domain.²¹

The observation of this study indicated that the lowest scores for the KAP were found for those possessing the diploma degree as qualification. Their levels of scores were found to be significantly low ($P < 0.05$) compared to the corresponding highest scores recorded for other demographic variables (Figure 1). In an earlier study, similar variation was observed in different qualified groups of professionals.²² Earlier study suggests that diploma degree holders attain specific knowledge needed for their profession and are mostly trained in the skill activities.²³ This could be the reason for significant lower KAP scores for this group of participants when compared with others.

The highest scores seen in the knowledge domain were for the female participants and for practice, the masters' or above qualified personnel (Figure 1). Female participants in the previous study also reported to possess good knowledge and better attitude. Their attitude can be directly linked to their knowledge as they were reported to be more conscious and serious in their activities including the professional works.²⁴ The masters' or above qualified persons in the past study also showed 'proper' practice. The possible reason suggested for this is their qualification, which makes them more confident while practicing their profession.²⁵

Table 3: KAP levels of healthcare professionals on recently approved antidiabetic Drugs

Demographics	Knowledge				Attitude				Practice			
	Good (%)	Fair (%)	Poor (%)	p - value	Good (%)	Fair (%)	Poor (%)	p - value	Good (%)	Fair (%)	Poor (%)	p-value
Profession				0.03*	58.6	28.3	13.1	0.62	52.9	36.5	10.6	0.54
Physicians	60.8	29.4	9.8		40.7	38.2	20.9		36.2	39.2	24.4	
Nurses	42.6	40.1	17.1		49.3	34.1	16.6		47.3	32.6	19.7	
Pharmacists	55.1	31.9	12.9									
Gender Male	57.3	28.6	14.1	0.62	50.1	30.7	19	0.71	58.7	25.7	15.6	0.64
Female	62.9	20.3	16.6		48.6	36.9	14.5		52.6	34.5	12.7	
Age Less than 35 Yrs	70.1	16.4	13.5	0.02*	59.8	28.5	11.6	0.86	52.2	31.7	16.1	0.36
Above 35 Yrs	61.2	20.4	18.2		50.4	35.3	14.3		66.3	24.1	9.5	
Nationality Saudi	66.9	21.4	11.5	0.59	57.9	25.6	16.2	0.75	56.9	23.7	19.4	0.77
Non-Saudi	54.7	30.8	14.9		49.7	39.5	10.7		60.7	20.7	18.5	
Educational level	47.4	26.8	25.6	0.72	39.7	37.5	22.6	0.91	40.2	29.5	30	0.71
Diploma Bachelor degree	52.8	27.7	19.3		48.5	34.1	17.4		48.5	32.8	18.5	
Masters' or above	63.8	19.5	16.7		52.6	34.9	12.2		57.7	28.5	13.6	
Experience (Years) Less than 5 Yrs	61.3	27.8	10.9	0.80	56.1	28.2	15.7	0.69	47.5	32.8	19.6	0.86
6 – 10 Yrs	66.6	21.1	12.1		56.4	26.5	17.0		49.6	31.6	18.6	
11 – 15 Yrs	60.1	26.3	13.6		49.7	31.9	18.3		52.2	33.5	14.1	
More than 15 Yrs	57.5	26.6	15.7		50.8	32.7	16.5		60.5	26.5	13.2	

Note: The values are represented as percentage.

Statistics: One-way Anova followed by specific non-parametric post-hoc tests as per variables.

*P value less than 0.05.

Table 4: Correlation between KAP domains

Variables	Knowledge		Attitude		Practice	
	Correlation coefficient (r)	P -value	Correlation coefficient (r)	P -value	Correlation coefficient (r)	P -value
Knowledge	1	–	0.14	0.11	0.52	0.04*
Attitude	0.14	0.11	1	–	0.66	0.08
Practice	0.52	0.04	0.66	0.08	1	–

Statistics: Pearson correlation coefficient. *P value less than 0.05.

For the level of KAP about the GLP-1 RA drugs, the present data suggested that there is a significant variation in the knowledge domain for professional ($P = 0.03$) and for age ($P = 0.02$) criteria (Table 3). Earlier studies suggested that distinctions in profession might cause variation in the knowledge level because each specializations are trained for certain skills.^{23,25} Our observations also suggested that nursing staff members' response to the questions which are more specific to physicians (Q-3,6,14) is low ($< 45\%$) and pharmacists response to the nursing profession related question (Q-10) is low ($< 50\%$) (Table-2). Further, the age criterion has been reported to influence the knowledge domain of the participants. The participant having less than 35 years showed better knowledge since they have attained the most recent information about the variation therapeutic options available for treating a disease.²⁶

The level of KAP for the other variables was observed to be $\approx 80\%$. The important highlights include that physicians have 'better' KAP compared to other professionals. Females and Saudi nationals have 'better' knowledge and attitude

while males and non-Saudis have 'proper' practice. Increase in the level of qualification enhanced the level of KAP. Medical professionals with less years of experience have 'better' knowledge and attitude while more years in profession have 'proper' practice (Table 3). Previous studies suggest that the level of KAP can differ among the study-population and several factors such as profession, qualification and experience could contribute to this.²⁷

Although, the response of the participating group of medical professionals for the KAP questionnaire is satisfactory, but the information such as glycemic level after GLP-1 RA, potential risks, selecting the suitable GLP-1 RA, size of needle and referring patient's history before starting the GLP-1 RA medication requires suitable strategies for improvement.^{28,29} As the study did not include all the members of healthcare team of University, research that is more detailed is essential. From the present study data, it can be proposed that updating the information about the new additions in the therapy of chronic disease such as diabetes is essential for all the members of healthcare

providers. Continuous education program such as lectures, research meeting, group discussion, presentations, seminars, conferences and symposium could provide the opportunity to enlighten the medical information about the recent advances in medical profession.³⁰

LIMITATION OF THE STUDY

Due to time constraint, not all the healthcare professionals of the University could be contacted. Hence, the results of the study might not truly reflect the opinion of the entire members of the University.

CONCLUSION

The data from the study indicated that the healthcare professionals of Qassim University has significant knowledge, attitude and practice towards the glucagon-like peptide-1 class of antidiabetic drugs. However, some of the critical information such as the monitoring parameters and potential risks associated with the therapy needs update and can be achieved through continuing medical education programs.

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