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The research hotspots analysis of diabetes mellitus by pubmed

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ABSTRACT

Objective: To understand the research hotspots of Diabetes Mellitus by PubMed. **Methods:** With MS Excel, SPSS, Cytoscape software, we took MeSH (Medical Subject Headings) word frequency analysis, clustering analysis, co-word network graph of PubMed papers. **Results:** It shows that the current Diabetes Mellitus research hotspots had focus on “Diabetes Mellitus, Blood Glucose, Hypoglycemic Agents, Insulin”, etc, also the most importance of which was “Hypoglycemic Agents” of “Diabetes Mellitus”. **Conclusion:** It is helpful and timesaving for researcher or doctor to understand the research hotspots in Diabetes Mellitus.

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KEYWORDS

Diabetes mellitus;
Word frequency analysis;
Clustering analysis;
Co-word network graph;
Hypoglycemic agents.

INTRODUCTION

In recent years, the incidence of Diabetes Mellitus (DM) is growing rapidly worldwide, DM has become the third chronic diseases with serious threat to human health after tumor, cardiovascular disease. It is estimated that 366 million people had DM in 2011; by 2030 this would have risen to 552 million^[1]. DM is a serious public health problem.

DM current research mainly involve hypoglycemic therapy, DM complications threaten the health and life, and even lead to disability and premature death, hypoglycemic therapy has important meanings to the delay of DM complications. We hope that through this study the analysis of the subject headings can be drawn the outline of DM research hot spot.

Therefore this research retrieved the DM papers of PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) in

nearly two years, got 23487 papers, and analyzed MeSH of above papers using Co-word Analysis^[2].

MATERIALS AND METHODS

First, we retrieved PubMed papers with publication dates between 2 October 2011 and 2 October 2013. Second, search terms was “Diabetes Mellitus”[Mesh] AND (“2011/10/02”[PDAT] : “2013/10/02”[PDAT]). Third, using Microsoft Excel we recorded All Major Topic MeSH (Majr terms) of above papers, and sort and filter the terms, and looked for the high frequency terms (occurrences), and we also counted occurrences of two high frequency terms together in the same paper, setting up the original co-word matrix. Fourth, the statistical analysis: we made Majr term’s clustering analysis using SPSS13.0 statistical software, draw the co-word network graph of the high

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frequency terms using Cytoscape software^[3].

THE MAJR TERMS ANALYSIS OF PAPERS ABOUT DM

The Majr terms word frequency analysis

We retrieved 23487 papers, all with MeSH terms,

we extracted Majr terms and established the Majr terms database. We got 32 Majr terms of DM which occurrences frequency was over 290. From TABLE 1, we can infer some ideas: the relevant research of DM hotspots mainly concentrated in the “Diabetes Mellitus, Blood Glucose, Hypoglycemic Agents, Insulin”, etc, it also suggests that “Hypoglycemic Agents” of “Diabe-

TABLE 1 : The top 32 Majr terms about DM

Ranking	MeSH terms	Occurrences frequency (times)	percentage(%)	Cumulative Percent(%)
1	Diabetes Mellitus, Type 2	8146	8.2531	8.2531
2	Diabetes Mellitus	3388	3.4326	11.6857
3	Diabetes Mellitus, Type 1	3157	3.1985	14.8842
4	Hypoglycemic Agents	2437	2.4690	17.3532
5	Diabetes Mellitus, Experimental	1686	1.7082	19.0614
6	Blood Glucose	1493	1.5126	20.5741
7	Insulin	1357	1.3748	21.9489
8	Obesity	1134	1.1489	23.0978
9	Diabetes Complications	1129	1.1438	24.2417
10	Cardiovascular Diseases	1123	1.1378	25.3794
11	Diabetic Nephropathies	1043	1.0567	26.4361
12	Diabetic Retinopathy	969	0.9817	27.4179
13	Hemoglobin A, Glycosylated	718	0.7274	28.1453
14	Hypertension	685	0.6940	28.8393
15	Diabetes, Gestational	657	0.6656	29.5050
16	Insulin Resistance	645	0.6535	30.1585
17	Hyperglycemia	614	0.6221	30.7805
18	Diabetic Angiopathies	602	0.6099	31.3904
19	Insulin-Secreting Cells	578	0.5856	31.9760
20	Diabetic Foot	502	0.5086	32.4847
21	Diabetic Neuropathies	500	0.5066	32.9912
22	Metformin	374	0.3789	33.3701
23	Metabolic Syndrome X	356	0.3607	33.7308
24	Self Care	351	0.3556	34.0864
25	Prediabetic State	348	0.3526	34.4390
26	Coronary Artery Disease	335	0.3394	34.7784
27	Oxidative Stress	331	0.3354	35.1138
28	Polymorphism, Single Nucleotide	326	0.3303	35.4441
29	Plant Extracts	324	0.3283	35.7723
30	Hypoglycemia	319	0.3232	36.0955
31	Glucose	315	0.3191	36.4147
32	Kidney Failure, Chronic	292	0.2958	36.7105

tes Mellitus” has become DM most major research hotspots.

Clustering analysis of the high frequency Majr terms

This research used hierarchical clustering analysis which is one of the most commonly used Classify analysis to analyze the top 18 Majr terms which occurrences frequency was over 600 times), drew a dendrogram, and the results were shown in Figure 1.

From the Figure 1, in addition to individual Majr term as “Diabetes, Gestational; Diabetes Mellitus, Experimental;Diabetic Nephropathies;Diabetic Retinopathy”, we could seen the other high frequency Majr terms could be divided into the following four groups. Group 1 contains Majr terms (“Blood Glucose; Hemoglobin A, Glycosylated; Hyperglycemia; Hypoglycemic Agents; Insulin; Diabetes Mellitus, Type 1”), it suggests that it’s easy to have a high blood sugar in type 1 DM, treatment of DM is mainly by insulin treatment^[4], glyated hemoglobin is a good monitoring indicator of the blood sugar control^[5]. Group 2 contains Majr terms (“Cardiovascular Diseases; Diabetic Angiopathies”), it

suggests that DM vascular lesions is mainly for cardiovascular disease. Group 3 contains Majr terms (“Obesity; Insulin Resistance; Diabetes Mellitus, Type 2”), it suggests that Main show of DM is obesity and insulin resistance^[6]. Group 4 contains Majr terms (“Diabetes Complications; Hypertension; Diabetes Mellitus”), it suggests that Hypertension is one of the main complications of DM.

The above clustering results suggest that several

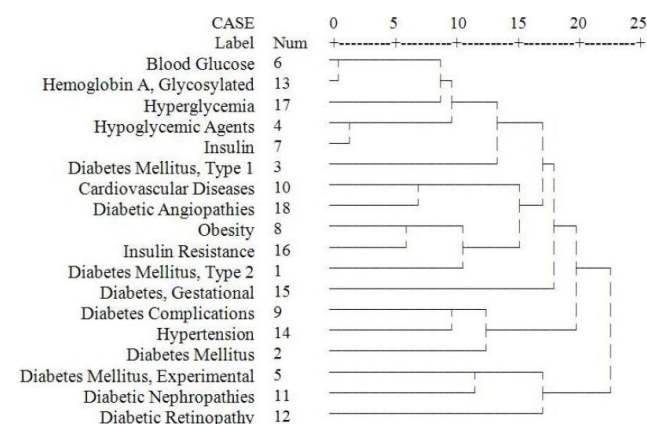


Figure 1 : Hierarchical clustering analysis dendrogram of Majr terms

TABLE 2 : The top 18 Majr terms pair

Ranking	MeSH terms A	MeSH terms B	Co-word occurrences frequency(times)
1	Diabetes Mellitus, Type 2	Hypoglycemic Agents	1398
2	Diabetes Mellitus, Type 2	Blood Glucose	707
3	Diabetes Mellitus, Type 2	Diabetes Mellitus, Type 1	674
4	Diabetes Mellitus, Type 2	Obesity	605
5	Hypoglycemic Agents	Insulin	586
6	Diabetes Mellitus, Type 2	Cardiovascular Diseases	551
7	Diabetes Mellitus, Type 2	Insulin	515
8	Diabetes Mellitus, Type 1	Insulin	401
9	Hypoglycemic Agents	Blood Glucose	375
10	Diabetes Mellitus, Type 1	Hypoglycemic Agents	361
11	Diabetes Mellitus, Type 2	Diabetic Nephropathies	332
12	Hypoglycemic Agents	Diabetes Mellitus, Experimental	284
13	Diabetes Mellitus, Type 1	Blood Glucose	279
14	Diabetes Mellitus	Hypoglycemic Agents	253
15	Blood Glucose	Insulin	251
16	Diabetes Mellitus	Blood Glucose	217
17	Diabetes Mellitus	Cardiovascular Diseases	213
18	Diabetes Mellitus, Type 2	Diabetes Complications	203

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Major terms within one group have certain inherent logic connection between each other; If there are no known correlation between the Major terms, it indicates we find a new research hotspot.

Co-word network graph of the high frequency Major terms pair

By analyzing the top 12 Major terms which word frequency were over 900 times, we got the top 18 Major terms pair (A and B, see TABLE 2) and co-word network graph of the Major terms pair (see Figure 2). Especially the first Major terms pair of “Diabetes Mellitus, Type 2” and “Hypoglycemic Agents” appeared 1398 times in the same paper, it was far higher than that of the second MeSH terms pair (707 times, “Diabetes Mellitus, Type 2” and “Blood Glucose”).

In Figure 2 the edge represents the concurrence relationship between Major terms pair and if the edge between one Major term to other Major term, it suggests that the one Major term is more important, it is in the center of the research hotspots. So we could infer that “Hypoglycemic Agents” of “Diabetes Mellitus” is the research hotspots of DM now.

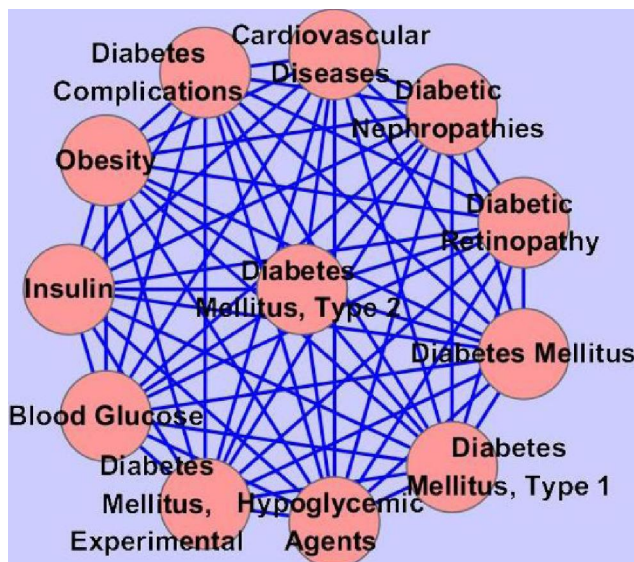


Figure 2 : Co-word network graph of the high frequency Major terms pair

CONCLUDING REMARKS

By analyzing MeSH terms (word frequency analysis, clustering analysis, co-word network graph) of PubMed papers about DM, we could infer that the

current DM research hotspots had focus on “Diabetes Mellitus, Blood Glucose, Hypoglycemic Agents, Insulin”, etc, it also suggests that the most importance of which was “Hypoglycemic Agents” of “Diabetes Mellitus”.

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