

1 AHP method for selecting the best strategy to Enhance Safety Culture
2 A Case study at “XYZ” Company in Qatar

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5

6 **ABSTRACT**
7

8 Lack of safety culture awareness in the ambulance services affects not only locally but
9 internationally in different countries, including at "XYZ" a company in Qatar. Many
10 studies mentioned about risks and hazards associated with ambulance services that result
11 from illnesses, accidents, or property damaged because of a lack of safety culture. The
12 results of the safety culture survey were showing less of commitment and involvement of
13 ambulance personnel to safety 52.6% and less motivation 57.9%. It supports by the
14 achievement of key performance index of ambulance services that was 85 % – 96 %
15 from the target. This paper discussed a strategy to improve safety culture in ambulance
16 services. The authors conducted a research study utilizing the AHP method to select the
17 best approach by following the real condition. This study compares the essential factors
18 in improving safety culture based on eight criteria and three strategies safety climate
19 which the result shows that (a) The commitment of senior management with a value of
20 0.247 or (247%), and (b) Operational approach strategy with a value of 0.386 or (38.6%),
21 with CR of 0.03 are among the top priorities needed in the operational of ambulance
22 services to run optimally.
23

24 **Keywords:** *Safety Culture, Ambulance Service, AHP*

25

26 **Introduction**

27 Indicators of a good safety culture in an organization can result from various factors like
28 as good safety commitment from top management and employees, compliance with
29 policies and regulations, quality services and professionalism or the existence of a safety
30 system in the organization. However, most of the people will see from the number of
31 accidents and illnesses that occur in the organization. This perception applies equally to
32 all organizations or agencies, including ambulance services.

33 Ambulance service is one of the core businesses in health services in the modern era.
34 Safety concerns in ambulance services are mandatory while delivering services. Failure
35 to provide optimal services and develop an ambulance safety culture, it will lead to risks,
36 hazard, and accident to ambulance personnel and patients.

37 Several factors are causing failure to provide high quality and excellent safety
38 performance in ambulance services such as physical and psychological condition,
39 professionalism, motivation and competence, work environment, weather, coworkers,
40 policy and finance problem. Pattersen, Weaver, & Hostler, D., (2015) states, in addition
41 to physical risks, EMS personnel also experience psychological risks. Many EMS
42 personnel violate in written regulations, failed on procedures, stress, felt insomnia and
43 exhausted and have no commitment to the profession. Uncontrolled and unpredictable
44 environmental conditions, lack of supervision, limited information and uncertainties that
45 often linked as factors that contribute to increased safety risks for patients in EMS
46 services (Price, Bendall, Patterson, & Middleton. 2013).

47 Due to lack of the safety culture in ambulance service, it will leads high risk incident and
48 accident that it will be harmful to ambulance personal and patient. Generally, there are
49 two main risks and hazards of working in an ambulance. There are work-related illnesses
50 and work-related accidents. Based on data from the NHTSA agency period of 1999-
51 2011, the number of accidents or collisions related to ambulance every year is around
52 4500 cases. 34% resulted in injuries and 33 people died. From the data that died, 4%
53 were ambulance drivers, 21% were ambulance passengers, 63% were passengers from
54 other vehicles and 12% were pedestrians (NHTSA, 2012).

55 Researched by Yilmaz, Serinken, Dal, Yaylaci, & Serpil, (2016) in Western Turkey,
56 regarding personnel ambulance accident, described: "The most accident happens in
57 ambulance service was motor vehicle accident (MVA). It is around 31.9% from a total of
58 163 personnel injured, needle-stick injuries (16.0%). Needle-stick injuries usually
59 occurred during intravenous line procedures (59.4%) and inside the cruising ambulance
60 (n=20; 62.5%). Working inside the ambulance was the most commonly accused cause of
61 the work-related injury-WRI (41.3%). Lin, (2018) supported it in Taiwan; Among the
62 1,627,217 traffic accidents during the study period, 715 ATA's caused eight deaths
63 within 24 hours and 1844 injured patients. On average, there was one ambulance traffic
64 accident-ATA for every 8598 ambulance runs. Compared to overall traffic accidents,
65 ATA's were 1.7 times more likely to result in death and 1.9 times more likely to have
66 injured patients. Amid 715 ATA's, 8 (1.1%) ATAs were fatal, and 707 (98.9%) were
67 nonfatal".

68
69 Similarly, it also happened in the ambulance service at XYZ Company. In the 2013-2018
70 period, there were 4833 emergency calls. Two thousand six hundred fifty-six calls
71 (55.5%) were related to patient management, and 45 % non-related. One hundred
72 seventeen cases (4.4%) were traffic accidents, 424 (16.0%) cases of trauma or injury,
73 2098 cases (79.0%) were medical, and 17 cases (0.6%) were dead on arrival. Whereas,
74 accidents related to ambulances or involving ambulance personnel not appropriately
75 recorded. There were 5 cases of crashes involving ambulances, no casualty but caused
76 ambulance damaged was high costs repaired.

77 Based on data from occupational health (OH) clinic period of 2016 - 2018, there were 3
78 cases of ambulance personnel suffered low back pain and spinal cord injury due to faulty
79 in lifting, 1 case of small head injury and 1 case of heat exhaustion. Number of sick leave
80 during 2017 was high. OH recorded, 1.55% (544 days) of health workers including
81 ambulance personnel submitted sick letters.

82
83 On annual report 2018 of safety performance reported, participate of providing incident
84 or accident says in the health department of XYZ Company, especially ambulance
85 services, was deficient. It was 16 reports during the 2013-2018 period. 90% are related to
86 patient management, and 10% similar to safety events; unexpected events (KTD) and
87 near misses (KNC).

88 The National Patient Safety Agency, (2011) in Wankhade & Jones, (2015) mentions
89 complex problems in the provision of ambulance services and related processes, as risk
90 factors for quality service failures. The risk and hazard in ambulance service are difficult
91 to avoid because of the environment condition and the nature of work itself, but it can be
92 reduced or minimized as little as possible by efforts to enhance occupational health and
93 safety system with increasing promoting strategy through the development of a safety
94 culture in the work environment.

95 Based on the description above, the author is interested in researching the strategy to
96 enhance safety culture at the ambulance service of the XYZ Company in Qatar. The

97 primary purpose of this research is to analyze existing problems, formulate priority
98 strategies and build up a model for strengthening the safety culture in ambulance services
99 at XYZ Company. Building a safety culture in ambulance services or organizations is
100 fundamental. A positive safety culture influenced by organizational performance and
101 safety management performance.
102

103 **Literature Review**

104
105 In the United States of America or most Europe countries, ambulance services were
106 called Emergency Medical Services (EMS). EMS is an ambulance service system in
107 terms of emergency services integrated in terms of facilities, professional personnel and
108 management systems that are standardized both nationally and internationally (Platt,
109 Stoy, & Lejeune, 2011). Principally, EMS practitioners have some responsibility as well
110 as another health practitioner in the hospital to provide established high-quality health
111 services to the patient. EMS practitioners more focus on pre-hospital management before
112 the patient sends to the hospital. As per the purposes, EMS practitioners have proper
113 education, high skill, and good mentality when delivery the services and good adapting
114 with situations and conditions in the scene.
115

116 To maintain and improve the care of patients, systematic documentation and periodic
117 audits, or other processes to ensure the quality of care, need to be incorporated. "Quality
118 management systems that are simple, are continuous, and allow for rapid changes in the
119 system need to be implemented" (Jones, 2015) in (Wankhade & Jones, 2015). The safety
120 and quality management in the ambulance became a priority and essential because a lack
121 of supervision in safety will be lead to an accident, loss of property damage, social
122 problem and protection for the personnel and patient. The Berwick Report (DH 2013) in
123 Pattersen, Weaver, & Hostler, (2015) explained, what steps to be required to improve
124 patient safety: "Identifying that incorrect organizational priority, systems, environmental
125 factors, and culture were contributory factors in failing to learn and in failing to protect
126 patients from harm". It is meaning, and we should eliminate the risk factors and
127 enhancing the safety culture in the ambulance to maintain the services and protect all
128 parties involved in ambulance services, including personnel and patient.
129

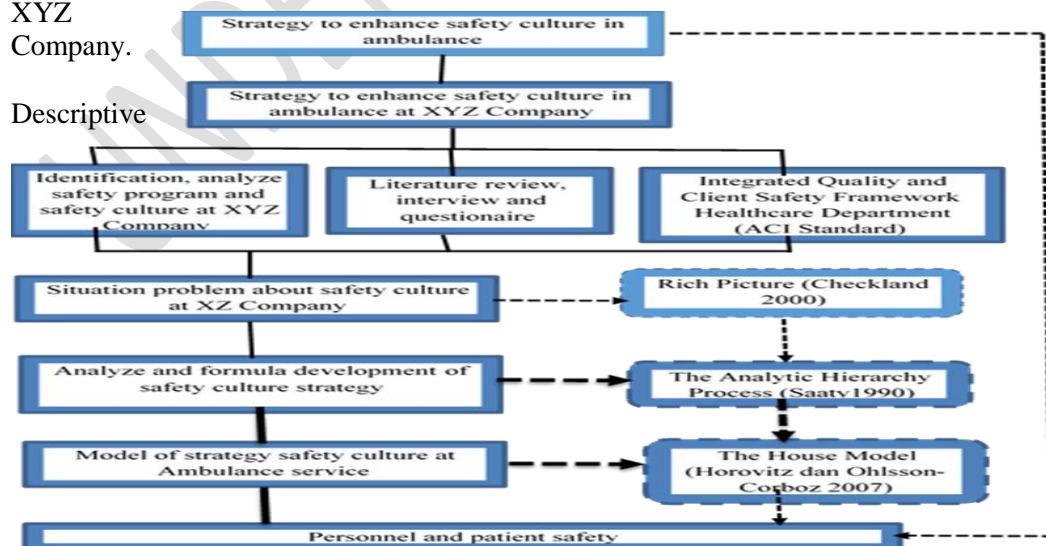
130 What is the safety culture means and how's to enhance safety culture? Confederation of
131 British Industry (CBI, 1991) defines "culture" is the way we do things around here".
132 Stranks, (2007) described as "a state of manners, taste and intellectual development of
133 mind, tastes, etc. by education and training." The Department of Mine, Industry
134 Regulation and Safety of Western Australia defined "the safety and health culture of an
135 organization is a reflection of the values, attitudes, perceptions, competencies, and
136 behaviors of the people working there (WHSQ, 2013). It reflects the organization's
137 commitment to, and prioritization of, safety and health as well as the effectiveness of the
138 organization's safety management system. The elements of a safety and health culture
139 organized into three categories: a). Organizational. It includes policies, procedures, and
140 systems that relate to safety and health. b). Psychological, involving individual
141 perceptions, attitudes, and values. c). Behavioral, what people do, health, and safety
142 behaviors. King (2013) Identified two distinct while developing a safety culture within
143 the organization: a). A transformation of systems, leadership, and organizational culture.
144 b). The administration created the conditions in which high standards of care are
145 delivered consistently, setting clear goals and standards for improving quality and patient
146 safety, and providing the tools for staff to address these goals within available resources.
147

148 In building a safety management system in adhering to a high quality in the ambulance
 149 service based on the enhancement of safety culture within the organization, there is some
 150 indicator that needs to follow. The cultural symbols utilized in many aspects of activities
 151 found within the organizations. It is how to measures specific features of a particular
 152 culture of the people or group of the people when they are doing communication,
 153 transaction, or other business. (Stranks, 2007) On human factors and behavior, safety
 154 said: "cultural indicators linked with Key Performance Indicators (KPI) and Success
 155 Criteria (Acceptance Criteria)." Within an organization, cultural indicators include
 156 a).Degree of loyalty and commitment displayed by all levels of the workforce. b).
 157 Presence of shared goals with specific signs. c). Policies and procedures. d). Evidence of
 158 fair and effective management systems. e).Investment in people (Training, frequent
 159 information) f).Investment in Technology. g). Compliance with a legal requirement.
 160 Personal integrity at all levels. h). System for communication both within and in our
 161 organization. i). A well-written mission statement. And j). A publicized reward structure
 162 that rewards high levels of performance. The organization operational and safety
 163 performance will influence those indicators. The indicator shows, the critical thing of
 164 build up a system and human resources as well to get a positive culture in the workplace.
 165 In the meantime, in the context of ambulance operational, the commitment from
 166 executive or top management are very significant because it is related to vision and
 167 mission, value, financing, and build up a system. Figure 1.1 below is a theoretical
 168 framework of the strategy to enhance safety culture at the ambulance service of XYZ
 169 Company.

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 175 **Methods**

176
 177 This type of research is conceptual research, which is research related to an idea or
 178 theory that might be applied, with a system approach. The theoretical research that I did
 179 was a concept, design, or strategy to improve safety culture at the ambulance service of
 180 XYZ Company in Qatar. The study conducted from March 2019- up to July 2019 at
 181 XYZ

182 Company.
 183 Descriptive



184
 Figure 1.1: Theoretical framework of strategy to enhance safety culture at ambulance service in XYZ Company Qatar

185 analysis is used to analyze data by describing the data collected without the intention to
186 create a generally applicable conclusion — the systematical data found by interview
187 results, observation, documentation, and survey. Descriptive analysis was used to
188 describe problems, risk factors regarding safety culture at ambulance services of XYZ
189 Company. After the study results well explained, the problematic situation described
190 with Rich Picture.

191
192 In this research, the author compiles primary and secondary data. Primary data collected
193 with the observation method, in-depth interview with the expert, who directly concerns
194 in enhance of safety culture in the ambulance services. In this research, choosing the
195 experts are used non-probability method and to collect data are used purposive sampling
196 technique. The primary data is used to obtain the information, assessment quality,
197 objective, and measurement of formulation strategies for enhancing safety in the
198 ambulance services of XYZ Company. The rest, secondary data taken from internal data
199 of XYZ Company, statistic, and yearly report, books, relevant websites, thesis, and the
200 related journals.

201
202 Data analysis methods used in this research are descriptive analysis, utilization of
203 questionnaire safety culture as tools analysis with SPSS25, Soft System Methodology
204 based Rich Picture (Checkland, 1999), AHP (Saaty & Vargas, 2012) in (Kholil, 2018),
205 and The House Model (Horovitz & Ohlson, 2007). By using AHP, the best choice
206 according to the objective condition determined (Kholil, Susanti, & Soechayadi, 2016).
207 The judgment from experts will be analyzed and arranged appropriately by Expert
208 Choice 2.0 software (Expert Choice, 2004) and presented with the house model. In this
209 research, five experts are involved. The expert for this research is two ambulance
210 practitioners at XYZ Company, one direct supervisor from management, one from
211 business, health and quality section (BHQ) as an auditor and one academician including
212 practicing in occupational and health and safety. The AHP process seen in Figure 1.2.

213 214 215 216 217 **Results and Discussion**

218 219 *Brief view of OH&S program* 220 *and safety culture at ambulance* 221 *service in XYZ Company Qatar* 222

223 The XYZ Company is engaged in
224 oil and gas. As a state-owned
225 company with international
226 tenure, the viability of a safety
227 management system in the
228 company mandates and must be in
229 operation. One standard that must
230 be met by the company is to
231 provide a plan and emergency
232 response system to deal with
233 emergency conditions and
234 situations. Ambulance service is one component in the emergency response system. The
235 ambulance service at XYZ Company operates 24 hours, 7/28 with a fleet of 4 units with
236 a total of 39 personnel from several different countries. Operationally, the ambulance

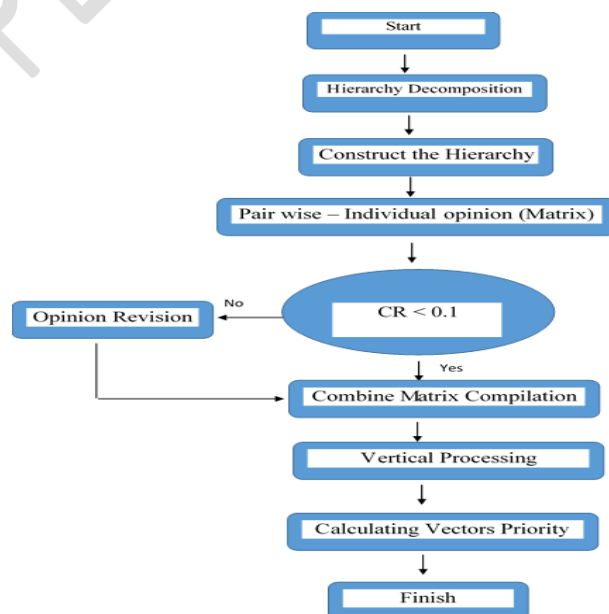


Figure 1.2: AHP Process

237 service provides emergency services for all employees in the industrial area, neither for
238 XYZ employees itself nor contractors and subcontractors.

239
240 Officially, the company have been received ISO 9001-2015 and ACI "Diamond" Level
241 (Accreditation Canada International) for Quality services, but not yet synchronized with
242 implementation at ambulance services.

243
244
245

Table 1.1: ACI – Accreditation Canadian International Program.

Category	Goal
Safety Culture	Building a culture of safety in the company
Communication	Improve communication and coordination in services and service providers and service recipients
Medicines Dispensing	Make sure you use drugs at risk
Work Environment	Establish a safe place and work environment in providing services
Infection Control	Decreases and minimizes the risk of disease due to service to service personnel
Risk Analysis	Identify risks to clients and employees

246 Source: ACI manual book 2018 XYZ Company
247

248 Management's commitment to safety seen in the form of the BHQ division (Business,
249 Healthcare, and Quality). "The BHQ team is responsible for the direction and
250 implementation of the management functions of compliance with procedures, service
251 quality, health risks in the work environment of the company clinic and ambulance". The
252 focus and responsibilities are "on improving quality, effective health risk management
253 and compliance with national health regulations to improve the health values of XYZ
254 companies and employees following health terms and standards, good service and cost-
255 effectiveness."

256

257 OH&S's Company strategies and objectives are as follows:

- 258 a. Improve the performance of the health system and service delivery (ensuring the
259 reach of health services that are accessible and sustainable according to the needs of
260 XYZ company employees and work partners and other stakeholders).
- 261 b. Safety, quality and client satisfaction (providing integrated, safe, high-quality health
262 services to improve the physical and mental health and well-being of clients).
- 263 c. Occupational health services and collaborative support (providing world-class
264 occupational health services for XYZ company employees and collaborative support
265 to internal and external stakeholders.)
- 266 d. Professional development (ensuring and maintaining a competent workforce through
267 the development of sustainable professionalism).
- 268 e. Efficient business processes and financial systems with integrity (ensuring financial
269 integrity through the implementation of efficient business processes).

270

271

272 **Data Findings and Analysis**

273 *Analysis or description of the problem situation in the XYZ company ambulance*
274 *service.*

275

276 In general, the Safety system and program in the XYZ Company are excellent, but the
 277 implementation in the field still needs to be improved. Based on the result of the safety
 278 culture survey, it showed in table 1.2:
 279

280 Table 1.2: Descriptive Analysis Result
 281 Safety culture at Ambulance Services in XYZ Company Qatar
 282

Criteria	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
				Lower	Upper
Management Commitment	9.4474	1.13179	.18360	9.0754	9.8194
Communication	9.0526	1.48774	.24134	8.5636	9.5416
Employee Involvement	8.5000	1.42847	.23173	8.0305	8.9695
Training & Information	9.3947	1.15172	.18683	9.0162	9.7733
Motivation	8.3158	1.71015	.27742	7.7537	8.8779
Comply with Policy & Procedure	8.8947	1.87140	.30358	8.2796	9.5099
Learning Organization	9.2105	1.29777	.21053	8.7840	9.6371

283 Resource: Extracted from SPSS25.

284

285 Based on table 1.2 above, the highest value is a management commitment criterion with
 286 an average score of 9.44 while the lowest cost is a motivation criterion with an average
 287 rating of 8.31.
 288

289

290

291 Table 1.3: Frequency Analysis Result
 292 Safety culture at Ambulance Services in XYZ Company Qatar

Criteria	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Management Commitment	No	11	28.9	28.9	28.9
	Yes	27	71.1	71.1	100.0
Communication	No	15	39.5	39.5	39.5
	Yes	23	60.5	60.5	100.0
Employee Involvement	No	18	47.4	47.4	47.4
	Yes	20	52.6	52.6	100.0
Training & Information	No	11	28.9	28.9	28.9
	Yes	27	71.1	71.1	100.0
Motivation	No	16	42.1	42.1	42.1
	Yes	22	57.9	57.9	100.0
Comply with Policy & Procedure	No	10	26.3	26.3	26.3
	Yes	28	73.7	73.7	100.0
Learning Organization	No	14	36.8	36.8	36.8
	Yes	24	63.2	63.2	100.0

293 Resource: Extracted from SPSS25.

294

295

296 Based on the table 1.3 above, comply with policy and procedure have the highest rating
 297 with a value of 73.7%, while employee involvement was the lowest value with a value of
 298 52.6%.
 299

300 This is supported by internal data which is the key to the work performance of the
 301 ambulance unit (KPI). In this case, it can be seen with unsatisfactory achievements from
 302 the patient handling report of 94% during 2018. Even though reporting on services to
 303 patients is fundamental as the legality of all actions that have been done. Likewise, the
 304 value of the reporting index of pain scale and response time were 96%.
 305

306 **Rich Picture (RP)**

307
 308 In this stage, identify the problem as a problematic situation known from the culture of
 309 the safety of ambulance services at the XYZ Company. Problematic situations aim to
 310 explain clearly about issues in the real world. The process at this stage is essential
 311 because it is related to the decisions of experts. After the results of the analysis
 312 concluded, the next process illustrated by drawing for explaining the situation in the real
 313 world. See, Figure 1.3 as below:
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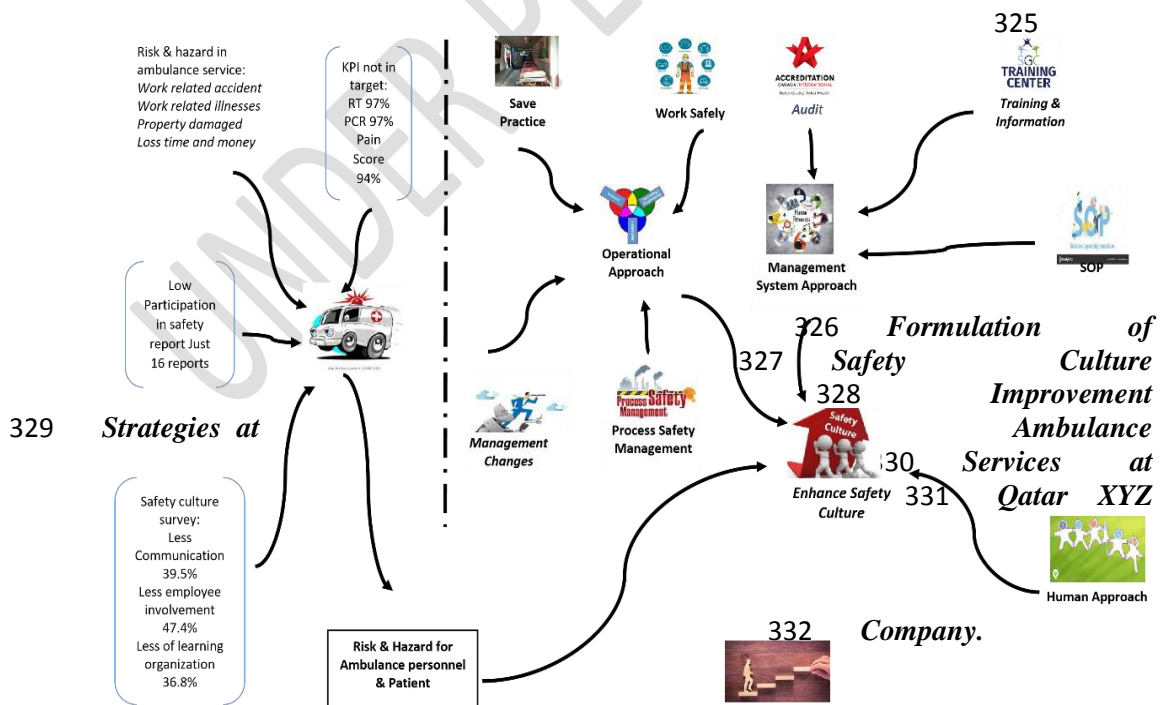


Figure 1.3: Rich Picture of Situation Problem at Ambulance service of XYZ Company

334 According to Expert's judgment towards 8 criteria's and 3 strategies proposed in the
 335 effort to enhance safety culture at ambulance service in XYZ company, there were 3
 336 main factors that get individual attention, namely: commitment of senior management is
 337 the most critical factor with a value of 0.247 (24.7%), followed by employee
 338 commitment and involvement with a value of 0.181 (18.8%) and compliance with
 339 regulations and existing procedures with a value of 0.140 (14%). The Expert's argued:
 340 "Commitments with a clear vision and mission from management and a good system
 341 improvement on OH&S will spur organizations and employees to always comply with
 342 OH&S." The synthesized result is seen in Figure 1.4.
 343

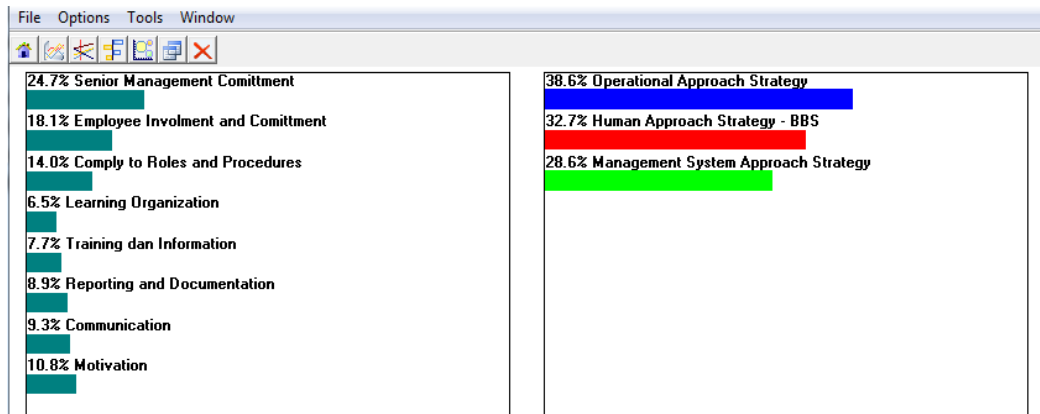


Figure 1.4: Strategy and factors to enhance safety culture at ambulance services at XYZ Company in Qatar. Sources: Extracted from Expert Choice 2000.

344
 345 The result of this research is in line with previous research from Price, 2013; Pattersen,
 346 Weaver, & Hostler. (2015) & Ernawati, Arini, & Haryono, (2017). They mentioned,
 347 "The risk factors that causing various hazards in the ambulance service environment, it
 348 came both internally and externally such as destitute of the systems, no organizational
 349 commitment, lousy culture, inadequate safety facilities and infrastructure. It is also
 350 because of procedures that do not meet standards, stress, lack of knowledge, training and
 351 motivation, conditions of work and weather climate". This study supported by Atack &
 352 Maher, (2010) on Perception of EMS personnel and health workers on safety issues in
 353 the pre-hospital service, they suggested, more active participation of EMS personnel to
 354 improve skills, clinical decision making and the necessity for changes in the regulations
 355 and health systems in the regions and the government, in the effort to enhance the safety
 356 of the patient.
 357

358 Anyhow, the essential strategy based on the expert's judgment was operational approach
 359 strategy with a value of 0.386 (38.6%). The following strategy was the human approach.
 360 In this approach strategy, the expert binds the second priority with a value of 0.327
 361 (32.7%). While the latter approach is a management system approach with a value of
 362 0.286 (28.6%). Overall this assessment has a level of inconsistency or CR 0.03 so that
 363 the opinions of experts can be accepted. See, Figure 1.5

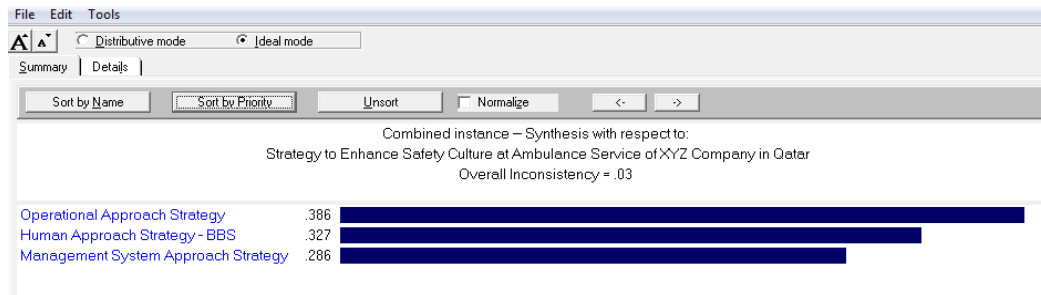


Figure 1.5: Priority of Safety Culture Improvement strategies in ambulance services at Qatar XYZ Company. Source: Extract from Expert Choice 2000

364

365 Based on the expert's judgment, who was prioritizing operational strategies was the most
 366 important with a value of 0.386 (38.6%) is very appropriate. It is because of the XYZ
 367 Company already has an excellent safety management system, but the implementation in
 368 the field still needs to be improved. In this case, it was evident from the KPI index that
 369 does not meet the target and safety culture results. The determination of safety values is
 370 not limited to paper, but it needs explicit work. For this reason, a strategy for improving
 371 safety culture with operational approaches can be carried out in the following ways
 372 (Ramli, 2013):

- 373 a. How to work safely.
- 374 b. Management changes
- 375 c. Safe operation
- 376 d. Process safety management

377

378 The second strategy should be developed is a humans approach strategy with a priority
 379 value of 0.327 (32.7%). The approach to insane, or better known as behavior-based
 380 safety (BBS), is a fundamental alternative strategy. This strategy requires hard work to
 381 run it. Behavior change cannot be done in a short time but requires clear steps and
 382 programs with the support of top management. They argue that; "Safety culture will run
 383 effectively and successfully if there is motivation and have positive attitudes and
 384 behaviors, so they will tend to do positive things too." Thus, all existing regulations and
 385 systems will be easy to run.

386

387 The last strategy is the approach strategy of the system with a value of 0.286 (28.6%). In
 388 this approach focuses on building an OH&S management system within the organization
 389 to improve the program and safety culture. Reasonable policies and procedures support
 390 the success of safety in the operation of ambulances or other activities — this approach
 391 made by creating a system of documentation, control of documents, and data. At the
 392 same time, building work plans in ambulances, targets, and excellent communication
 393 between personnel. The Expert's mentioned: "A safe way of working by analyzing the
 394 surrounding risks and following the procedures in the ambulance service, will provide a
 395 sense of security in working."

396

397 Studied by Jones (2005) in Wankhade & Jones, (2015) states, "Quality management
 398 systems that are simple, are continuous, and allow for rapid changes in the system need
 399 to be implemented". To maintain and improve service, systematic documentation,
 400 routine training, and continuous audits need to be promoted. It is also supported by
 401 Pirrallo, Khan, & Kuhn, (2005) "The development of policies and protocols related to
 402 operational safety directly impacts the safety of the patient". ". Those all the steps will
 403 improve the system and quality management in the operation of the ambulance.

404 According to Wankhade & Jones, (2015) in ethnographic studies in the UK about
 405 cultural elements in ambulances, identifying three different occupational subcultures
 406 using the Schein (1996) typology: Elements of safety and health culture can be organized
 407 into three categories: a). Organization. This includes policies, procedures, and systems
 408 related to safety, and health. b). Psychological, which involves individual perceptions,
 409 attitudes and values. c). Behavior, people's behavior, health, and safety behavior.

410
 411 Meanwhile, in the context of ambulance operations, commitment from executives or top
 412 management is very significant because it is related to the vision and mission, values,
 413 financing, and system building. If you do not have a clear commitment, the results will
 414 not be achieved. So with this, expert judgment can be summed up simply in an AHP
 415 hierarchy like figure 1.6 and in house model like figure 1.7.

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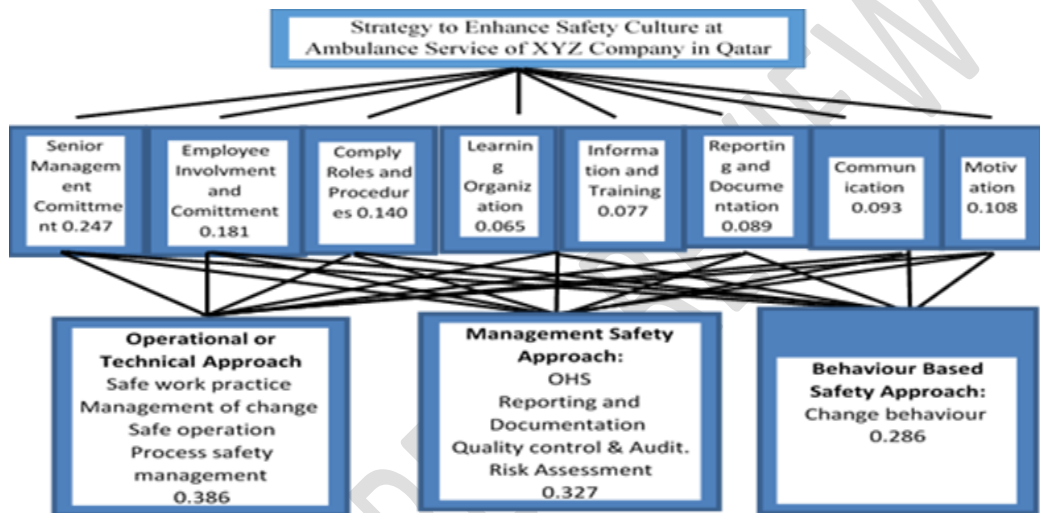


Figure 1.6: AHP Hierarchy Results of Strategy to Enhance Safety Culture at Ambulance Service of XYZ Company in Qatar.

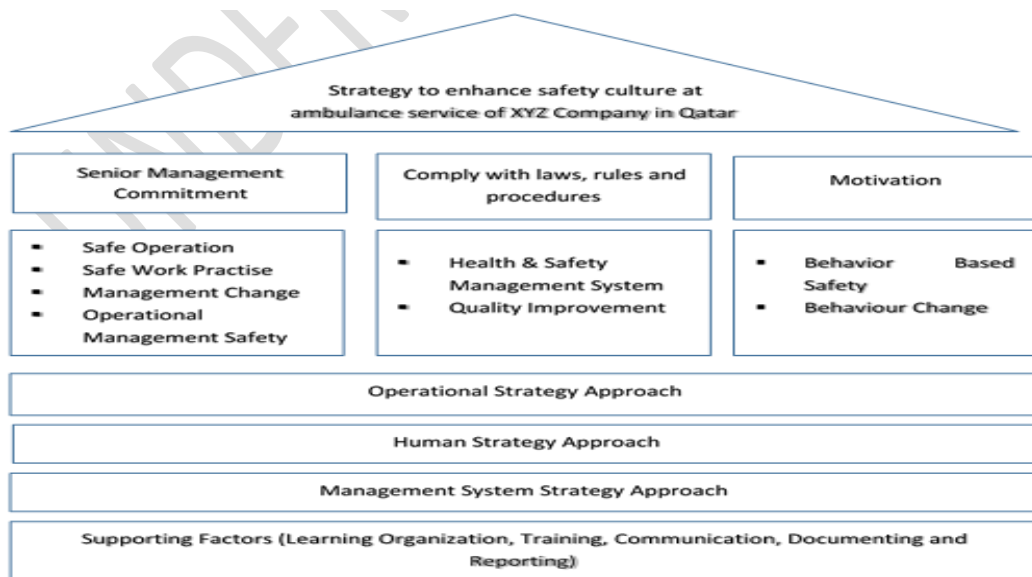


Figure 1.7: The House Model of Strategy to Enhance Safety Culture at Ambulance Service of XYZ Company in Qatar

419 **Conclusion**

420 Provide a high quality of ambulance services with the medical organization, and the
421 safety aspect is one most crucial component while delivering care. Enhancing safety
422 culture within an organization is one program to improve safety performance. According
423 to the expert's judgement and AHP Synthesized, Commitment from senior management
424 was the vital thing factor with a value of 0.247 (24.7%), following by employee
425 commitment and involvement with a value of 0.181 (18.8%), compliance with existing
426 regulations and procedures with a value of 0.140 (14%) and motivation 0.108 (10.8%).
427 Those are essential factors in efforts to improve safety culture in ambulance services.
428 The operational approach is an alternative development strategy with an analysis of the
429 value of 0.386 (38.6%). These factors and strategies will have an impact on the
430 development and improvement of safety culture in ambulance services at the XYZ
431 Company with the ultimate goal of fulfilling safety protection for personnel and patient.

432 The House Model method is a model or presentation of a strategy to improve safety
433 culture in the ambulance service with a mission on the safety of ambulance personnel
434 and patient. The three main factors become pillars in building a strategy to improve
435 safety culture in ambulance services, namely commitment from management and
436 employees, compliance with regulations and motivation. These pillars upheld through
437 operational approach safety programs through safe work, changes to management by
438 making regulations and work standards, synergized with approaches to employees by
439 changing behavior and perceptions and providing motivation with the support of a sound
440 system approach about safety through a safety management system that continues to
441 develop with the ongoing audit.

442

443 **COMPETING INTERESTS DISCLAIMER:**

444 **Authors have declared that no competing interests exist. The products**
445 **used for this research are commonly and predominantly use products in**
446 **our area of research and country. There is absolutely no conflict of interest**
447 **between the authors and producers of the products because we do not**
448 **intend to use these products as an avenue for any litigation but for the**
449 **advancement of knowledge. Also, the research was not funded by the**
450 **producing company rather it was funded by personal efforts of the**
451 **authors.**

452

453

454 **Recommendation**

455

456 Further research needs to be done in an effort to develop a safety culture in ambulance
457 services and the development of safety programs that are directly related to the safety of
458 ambulance personnel and patients in particular. The development of safety culture in
459 ambulance services will improve the quality of services that prioritizes the safety of
460 personnel and patients.

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