Death of Stars from Quranic Perspective and its Correlation to the Astronomical Context

Raihana Abdul Wahab, Ishak Suliaman, Mohd Zambri Zainuddin, Mohammaddin Abdul Niri, Nurulhuda Ahmad Zaki, Khadijah Ismail and Mohd Saiful Anwar Mohd Nawawi

INTRODUCTION

Stars are celestial bodies that have their own life cycles. Their lifetimes are much longer compared to the human being. All stars are born in large cold dense clouds of gas or called nebula clouds, but their death processes are different depends on their mass. According to Islamic outlook, it’s a must to refer to the Quran, the Hadith (the tradition of Prophet Muhammad) and the views of Islamic scholars in comprehending any issues. There are a number of astronomical phenomena mentioned in the scripture of the Quran including the dying process of stars. This study aimed to clarify the perspective of Islam referring to the scripture and correlate it to the astronomical descriptions about how stars died.

Methodology of Research: This paper is based on library research. Content analyses of both perspectives were obtained from acknowledged writings. The explanations for the death of stars according to the astronomical context were primarily comprehended. Then, for Islamic perspective, data were collected from the Quran and the exegetical writings from Mufassireen (experts who interpret the Quran). Finally, both perspectives were correlated which covered similarities, differences and integrated ideas from both perspectives.

Stars in the Quran and Astronomical Explanation: Generally, there are two aspects of stars in the Quran related to science and can be correlated to the astronomical context. Firstly, stars are mentioned in the

Corresponding Author: Raihana Abdul Wahab, Department of Fiqh and Usul, Academy of Islamic Studies, University of Malaya, 50603 Kuala Lumpur, Malaysia. Tel: +603-70676011, Fax: +603-70676141.
Quran in several words embedded the meaning of the star itself and its features. The words are (1) al-najm/al-ujum (star/stars), (2) al-buruj (constellation), (3) kawkab/kawakib (star), (4) masobih (lamp), (5) khunnas and (6) syi’ra (Sirius). There are four verses of Quran contain the term of al-najm pronounced in a single form (mufrad) and nine verses in plural (jamak) which is al-nujum. Al-najm directly means a star. Another term, al-buruj is referred as group of stars in the skies or constellation. Constellations are mostly known as meant group of stars that configure a pattern in the sky such as Orion and Leo, or any areas in the definite celestial sphere that is marked with arbitrary boundary lines. According to Mufassireen, it is concluded that there are four interpretations concerning the word al-buruj. Firstly, star(s) in a group means constellations or zodiac. Secondly, al-buruj brought the meaning as guard of the skies (al-qusur). Thirdly, al-buruj brought the meaning of an interesting creation. Fourthly, clusters of stars [1]. Another word is al-kawkab mentioned in the Quran is to describe stars as decoration of the skies [2]. Al-khunnas is defined as a star that is moving and not stationary. Some of Mufassireen claimed that al-khunnas is a moving star. The term of al-masobih or lamp basically means shining. Stars are named as lamp because it shines [3]. There is only one Quranic verse mentioned al-syi’ra which is in the 49th verse of Sura al-Najm [4]. In astronomical context, al-syi’ra referred to the star named Sirius which was described astronomically as a binary star. A binary star is a pair of stars that revolves around each other due to the gravitational force exists between them [5]. At this point, it might be concluded that the specific term from the verses of Quran which can be referred as star is al-najm. While, the words of al-kawkab, al-kawakib, al-khunnas, al-masobih are referring to the features of the star itself; shining, moving and radiates its own light and heat [6].

Secondly: The Quran also has explained the role of stars. One of the role is providing direction for people to go at night in the desert or the sea. It’s mentioned in following verses “and marks and signposts; and by the stars (men) guide themselves” [4]. Astronomical context stated the role of stars in daily applications; navigation, measurement, mapping, weather and aeronautics. The scripture also defines stars as lower heaven as stated in these verses, “We have indeed decked the lower heaven with beauty (in) the stars” and “And we have, (from of old), adorned the lowest heaven with Lamps” [4]. These phrases also indirectly illustrate the starry night is the marvellous creation by God, The True Creator. At this stage, we can identify some of the understanding from the verses of the Quran is still consistently fit with astronomical context. However, the scripture also described the role of stars beyond of astronomical justification, for example, the stars also are a guard and protection from Evil which referred to the shooting stars. It is mentioned in several verses such as “We have made such (Lamps) (as) missiles to drive away the Evil Ones, and have prepared for them the Penalty of the Blazing Fire” and “And (moreover) we have guarded them from every evil spirit accursed, But any that gains a hearing by stealth, is pursued by a flaming fire, bright (to see)” [4]. This shows the scripture is not only provide a physical understanding in explaining the role of stars but also covers another metaphysical perspective which is beyond astronomical justification. The following writing will attempt to identify the Quran’s perspective on stars life cycles and the dying process of stars.

The Dying Process of Stars from Astronomical Context: The life cycles of stars consist of some stages regarding on the changes of their ageing. They born, grow up as a proto star, mature in main sequence and old aged stages before die [7]. However, different stars vary in term of colour, size and brightness. The bigger a star, the hotter and brighter it is. Hot stars are blue in colour while smaller stars are less bright, cooler and red in colour. Because they are so hot, the bigger a star actually has a shorter life span than the small and cool ones [7]. The life cycles of star depends upon its initial mass and chemical composition [8].

Birth of Stars: Stars are born in giant clouds of dust and gas. Sometimes the cloud shrinks because of gravity. The shrinking cloud becomes hotter until it is hot enough to produce a nuclear reaction at the core, then a star called is born. This stage is the earliest phase in their life cycle [9].

The Main Sequence: The second stage of star life cycles is the main sequence. All stars are in the main sequence after totally achieved the hydrostatic equilibrium. It is the inward force which tends to compress the star, balanced by the outward force due to the pressure [9]. All main sequenced stars are powered by the fusion of hydrogen into helium in their cores. High-mass main sequenced stars have shorter life spans than low-mass main sequenced stars [5].
**Old Star:** Before stars die, they become old stars. After the hydrogen fuel in the core of the star is used up, no new heat is produced and gravity will take over and the core of the star will shrink. This makes the very outside of the star “float up” and cool down, making star changed into a big and red body called a Red Giant or Supergiant star [9]. As the centre collapses, it becomes very hot again, eventually getting hot enough to start a new kind of nuclear fusion with helium as the fuel. Then the Red Giant shrinks and the star looks normal again. This does not last very long, though, as the Helium runs out very quickly and again the star forms a Red Giant. Red Giant star turns to second phase when helium shell burning begins around the inert carbon core after the core helium is exhausted. Condition for Supergiant stars (massive stars) in second phase begins when the fusion of heavier elements starts in the core after helium runs out. The stars fused many different elements in a series of shells while iron collected and clumped in the core [9].

**Death of Stars:** The last stage in stars life cycles or the way it finally dies depends on its mass. Low massed stars from Red giant stage turns to Planetary Nebula when outer parts drifted off into space and cool down. They are not able to fuse carbon or heavier elements into their core and ended their lives by expelling their outer layers and leaving behind a White Dwarf; or a carbon star [7].

For the massive stars in old age stage, iron cannot provide fusion energy, so it accumulates in the core until degeneracy pressure can no longer support it. Then the core collapse causes huge explosion called Supernova. The core collapse forms a ball of neutrons which may remain as neutron stars; super dense object, or collapse further to form a black hole [7].

**RESULTS**

The study has identified several words from the verses of Quran can be correlated to the dying process of stars which are (1) *hawa* on verse “By the Star when it goes down” [10], (2) *tumisat* on verse “Then when the stars become dim” [1], (3) *inkadarat* on verse “When the stars fall, losing their luster” [1, 11] and (4) “*intatharat*” on verse “When the Stars are scattered” [12].

**Hawa - Fall Down, Goes down:** The word *hawa* can be found in verse “By the Star when it goes down”. The word refers to the end of stars’ life cycles. According to the contemporary Muslim scholar, ‘Abd al-Da’im al-Kahil [13], he stated that the word *hawa* is the most accurate to represent the end of a star life cycle (fall, *nihayah*, *sagata*), and not the word death (*maut*). He explained that the stars do not experience death because death means that stars cease to move, which is simply not the case, as stars turns to other forms as previously discussed. Therefore, he insisted that the word *hawa* or fall (*sagata*) is disintegrating into other objects are the most accurate. This describes the end of stars as currently occurring and not referring to the end such as on the Resurrection Day [13].

**Tumisat-Becoming Dim:** Some of *Mufassireen* in their exegesis agrees that the term *tumisat* means becoming dim or loss of light. Al-Razi, among early Muslim scholars added essential information by saying that the term means burning [14]. According to al-Asfahani, the word *tumisat* means dying out undetected or losing light. Other *Mufassireen* had different opinion when interpreting this as destruction.

<table>
<thead>
<tr>
<th>Quran</th>
<th>Astronomical Context</th>
<th>Low Mass Star</th>
<th>Massive Stars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stars go down</td>
<td>Star collapse, run out from fuel hydrogen</td>
<td>Red Giant</td>
<td>Supergiant</td>
</tr>
<tr>
<td><em>(Sura al-Najm, verse 1)</em></td>
<td>after that helium runs out in the core</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Becoming dim</td>
<td>Losing Light, when outer parts drift</td>
<td>Planetary Nebula</td>
<td>-</td>
</tr>
<tr>
<td><em>(Sura al-Mursalaat, verse 8)</em></td>
<td>off into space and cool down</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stars fall, losing their luster</td>
<td>Not enough to fuse carbon or heavier elements in their cores and the end of their lives by expelling</td>
<td>White Dwarf</td>
<td>-</td>
</tr>
<tr>
<td><em>(Sura al-Takweer, verse 2)</em></td>
<td>their outer layers and leaving a carbon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Falling down and scattered</td>
<td>Iron cannot provide fusion energy, so it accumulates in the core until degeneracy pressure can no longer support it.</td>
<td></td>
<td>Supernova</td>
</tr>
<tr>
<td><em>(Sura al-Infitaar, verse 2)</em></td>
<td>Then the core collapse causes huge explosion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Correlation for the remnant stars between Quran and astronomical context

<table>
<thead>
<tr>
<th>Quran</th>
<th>Remnant Stars</th>
<th>Astronomical Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>“He is The Lord of Sirius (the Mighty Star)” – Verse 49, Sura al-Najm</td>
<td>White Dwarf</td>
<td>Sirius B is among White Dwarf Stars. Astronomy found that White Dwarf is commonly in Binary Star</td>
</tr>
<tr>
<td>“Stars with piercing brightness” – Verse 1-3, Sura al-Tariq</td>
<td>Pulsating Neutron Stars</td>
<td>The star highly magnetized. Rapidly spinning and their energy found only by radio source</td>
</tr>
<tr>
<td>“Invisible, moving and sweeping” – Verse 15-16, Sura al-Takwir</td>
<td>Black Hole</td>
<td>They are the graveyard of the stars; swallow and sweep everything coming close to it even light and they are swimming in the space. As they have very enormous gravity they attract even light and do not reflect it and do not allow any light to leave, so, they are invisible</td>
</tr>
</tbody>
</table>

According to Arabic Dictionary, Ibn Manzur said in his book, “Thus the destruction of a planet is by its loss of light” [15]. Both views from Mufassireen and Arabic linguists showed the strongest view on this word means loss of light.

Inkadarat-Stars Fall, Losing Their Luster, or Intatharat - Stars Are Scattered: In discussing the word inkadarat, Ibn Kathir narrated all the views that synonymize inkadarat with intatharat which means falling. This kind of interpretation is not really accurate because the two words are different. It is undeniable that Arabic dictionary and rhymes did not justify clearly the difference of the words. From the views of various scholars, it most likely that inkadarat means changing and falling that occurred on the star and it starts to fall down while the word intatharat means falling down and scattered [16].

Table 1 shows correlation both perspectives on how the death of stars occurred. The correlation showed the understanding from the verses of the Quran can be elaborated in astronomical context. The explanations from the verses of Quran can be arranged step by step to explain the dying process of stars according to the arrangement of Sura begin from Sura al-Najm (53:1), Sura al-Mursalaat (77:8) then Sura al-Takwir (81:2) and finally Sura al-Infitaar (82:2). Though the verses of Quran contain the understanding on the dying process of stars, the astronomical context can be employed to elaborate the understanding in the empirical manner.

Table 2 presents the remnant stars after the dying process of stars. The understanding from verse 49 Sura al-Najm can be correlated to the white dwarf from astronomical context [5]. In Sura al-Tariq from verses 1 to 3 according to ‘Abd al-Da’im al-Kahil, the word “al-thaqib” might refer to the remnant stars after explosion (supernova) which is the neutron star. This opinion differs with other earlier scholars who tend to interpret it as the Sun and Saturn. Early Mufassireen such as Al-Jauhari and Qatadah defined it as ‘shining’, meanwhile Al-Najjar had the same opinion with al-Kahil in this matter [17].

The Quran also explained the black holes based on their characteristic on verses 15-16 Sura al-Takwir. Early Mufassireen just interpret this verse as moving stars but contemporary Muslim experts in exegesis like an-Najjar and al-Kahil explain about this matter. They concluded the three words which are al-khunnas means hidden or invisible, al-Jawar means always moving and expanding and al-kunnas refers to an attraction force or vacuum cleaner [17]. All of these words have its relations to the black hole itself; it can’t be seen, no one knows what is behind it, it always expands and it has great gravitational force [5].

CONCLUSION

The obtained results show the understanding from the verses of Quran related to the several aspects of stars; literal meaning, features, roles and dying process, is still consistent with astronomical context. Astronomical context still can provide detailed explanations empirically to elaborate the understanding though it is limited to the physical dimension of stars. Another dimension which is the metaphysical perspective is beyond of astronomical context. The study suggests the exegesis of previous Mufassireen related to the dying process of stars have to be updated with contemporary context using astronomical approach.

ACKNOWLEDGEMENT

This paper has been presented in Shanghai International Conference on Social Science on August 14-17, 2012 in Shanghai, China. This paper has been updated in terms of data analysis.

122
REFERENCES

15. Anynomous, (n.d) al- Baheth al-Arabiyy Retrieved May 13, 2012 from http://baheth.info/?term=%D8%B7%D9%85%D8%B3%D8%AA